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APRIL 1962



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# "AMATEUR RADIO"

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before the 1st of the month preceding publication. Technical articles should preferably be typed, double spaced, on one side of the paper, signed and numbered. All drawings should be large and done in Indian ink.

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## OUR COVER

The highest radio station in Australia was situated on Mt. Kosciuszko. The "Command" equipment was operated by VK2ZXY and VK2ZPJ who contacted fourteen stations.

## COMMENT

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## FEDERAL CONVENTION

The Federal Convention—the first for three years—will be held over the Easter holiday period when some fifty odd agenda items plus general business items will be discussed. It is being held in Perth in the same year as the British Empire Games.

The discussions at a Convention affect every Amateur in Australia and it becomes mandatory that you, the Amateur, know what is being discussed and why. For economical reasons the agenda will not be published in "Amateur Radio", but a précis of the determinations will appear some time after the conclusion of the Convention. In the meantime, if you are interested in affairs which might well govern your interest in our world wide hobby, then contact the Federal Councillor of the Wireless Institute of Australia in your State and ask to peruse a copy of the agenda. Then, if there is something on which you would like a say, you record your remarks with him and he will submit them to the Council of the Division. The Council will then determine whether your ideas in part or in whole will be included in the delegate's brief to the Convention. Alternatively, you have had the opportunity over the past several months to discuss part of the agenda with representatives of your State's Divisional Council at the monthly meeting of the Division.

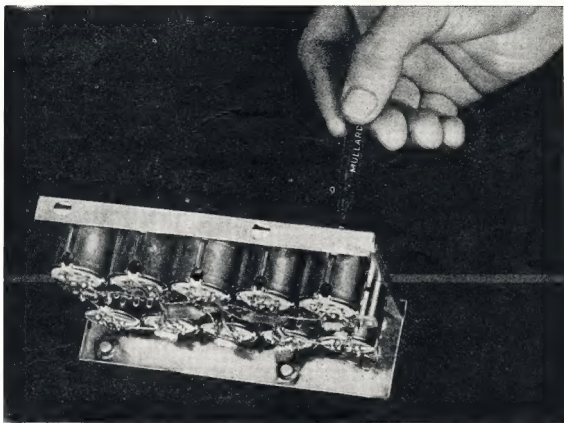
At the risk of reiteration it is said again—in fact can never be said too forcefully—that Amateurs all over the world should take more interest in the Societies and Institutions which represent them in order that their place in the spectrum can be preserved for them, and the facilities for the conduct of their unique hobby maintained.

Conventions are one way of doing this and you will find these organised in every country in the world where Amateur transmitters are permitted. It is because a hard working proportion of licensed Amateurs give of their time, sometimes against steep opposition and ill-informed critics outside the field of our activities, that you enjoy Amateur Radio. Take an interest in the affairs which govern your hobby and you assist those who dedicate their time to your problems.

FEDERAL EXECUTIVE, W.I.A.

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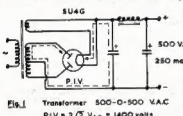
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# SILICON DIODES *for the* RADIO AMATEUR

A. H. S. BRIDGMAN,\* VK2AHO

SILICON diodes for power rectifier purposes are now on the market and are already being used in television receivers and other commercial electronic equipment. Amateurs already committed to 866As and 5U4Gs are not likely to throw these excellent tubes away. However, for those starting from scratch, and also for those who enjoy pursuing the art of building more efficient, more compact, more reliable equipment, silicon diodes are well worth considering. In order to apply these diodes in the most economic way, a sound understanding of the fundamental principles of power supplies is essential. So let us start with a short "refresher course".

To avoid confusion it is best to adopt one system of rectifier ratings in preference to all others. We are used to saying that a 5U4G is a full-wave rectifier good for 500 volts d.c. at 250 mA. d.c. These figures only apply to the standard full-wave circuit such as that of Fig. 1, in which a transformer giving 500 volts r.m.s. each side of the centre tap is employed. The voltage drop across the rectifier, in the transformer windings, and in the smoothing choke, usually ensures that the full-load output voltage is about 500 volts d.c., although the peak (no-load) voltage will be close to the theoretical maximum of  $500 \times \sqrt{2} = 700$  volts approximately.

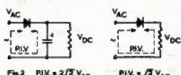


The voltage which determines the rating of each diode in the circuit, however, is the Peak Inverse Voltage (p.i.v.). This is the maximum reverse voltage which the diode is called upon to resist. In the circuit of Fig. 1, the p.i.v. is equal to the d.c. voltage across C1 plus the peak a.c. voltage acting in series with it across one diode. The worst condition is no-load, when the p.i.v. at the diode is  $700 + 700 = 1,400$  volts. This, then, must be the true rating of the rectifier. If you don't believe it, look up the p.i.v. rating for a 5U4G in your valve tables!

Another point is that the reservoir capacitor C1 is charged on alternate half-cycles by alternate diodes. Each diode, therefore, passes 250 mA. (r.m.s.)

only for half the time. Its continuous rating is only 125 mA. d.c. output.

It is important to understand these "true" ratings for rectifiers because that is the way manufacturers express the ratings of their silicon diodes. Confusion may result if you don't stick to these two fundamentals, the p.i.v. and the d.c. output current.



Some manufacturers quote, in addition to p.i.v., the maximum permissible r.m.s. input voltage for a given rectifier. This immediately means that they have to give two figures, one for use with an input capacitor and one for use with a resistive load. As you can see from Fig. 2, the permissible r.m.s. input voltage for the second case is twice that for the first, because there is no steady d.c. voltage acting in series with the applied a.c. voltage on reverse half-cycles. Incidentally, the maximum d.c. output current may be different for the two cases, due to the different current wave-form in the diode.

So now we have silicon diodes. Those currently available at low prices are high-current, low-voltage types, ranging from 400 p.i.v. at 500 mA. d.c. to 800 p.i.v. at 500 mA. d.c. The problem is how to use them in an economic manner. The first impulse is to put them in series, of course. To replace a 5U4G with Philips OA210s (rated at 400 p.i.v. at 500 mA. d.c.) we would need four in series in each half of the full-wave circuit of Fig. 1, making a total of eight. The maximum d.c. output would then be  $2 \times 500 \text{ mA.} = 1 \text{ ampere}$ ; unless you particularly want this current, and can back it up with a suitable transformer, the design is uneconomic, at present.

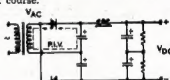
The answer is to use a voltage doubler circuit, as in Fig. 3. When used in conjunction with high value capacitors (which are also available now) the full-load output d.c. voltage is almost equal to the peak of the a.c. input voltage; in other words the regulation is extremely good. To obtain 500 volts d.c. from the circuit of Fig. 3 we are only concerned with 500 volts p.i.v. at each diode, since the d.c. voltage across each capacitor is only 250. The peak a.c. input voltage to each diode is only 250 which means that the r.m.s. voltage of the transformer secondary should theoretically be 180 volts. To allow for voltage drops this should in practice

be raised to about 200 volts. A good rule is:—

$$\text{D.c. output voltage (full-load)} = 2.5 \times \text{r.m.s. input voltage.}$$

With this arrangement we would only need four diodes type OA210, or only two type OA214, to give us 500 volts at 500 mA. Recommended values for the capacitors are 100  $\mu\text{F.}$  at 350 volts d.c. working. The cost of this power supply is well below that of the equivalent 5U4G circuit; and furthermore, it is smaller, lighter, less dangerous, more reliable, has practically infinite life expectancy, and runs at a fraction of the heat loss.

The advantages don't stop here, they only start! Owing to the large value capacitances, the a.c. ripple in the output is very low. In power supplies for p.a. and modulator stages, the inductance of the modulation transformer gives us free smoothing and the choke in Fig. 3 may be omitted. A choke is only needed in the supply line to the low-level stages, and this of course can be smaller. Omission of the big feller leads to even better voltage regulation, of course.



The next step is the omission of the mains transformer altogether.\* With this arrangement, using two OA214s, we can get 600 volts d.c. at 500 mA. from 240 volt a.c. mains. The application of a circuit of this type should be limited to power supplies for p.a. and modulator stages, all other sections following normal practice. In this way the number of components connected "directly" to the mains (via the diodes) is reduced to the minimum. The chassis must be earthed in the usual way, and the cathodes taken to a separate negative h.t. line.

Provided that all the normal precautions are taken this arrangement is no more dangerous than the conventional set-up. In fact, it is safer, because the maximum voltage to earth anywhere in the transmitter is only 300, against 600 volts in a conventional arrangement.

\* This is not recommended for Amateur practice. In all instances an isolating transformer should be used on mains input. The circuit is included for interest only.—Editor.

\* Flat 1, 26 Spruson St., Neutral Bay, N.S.W.



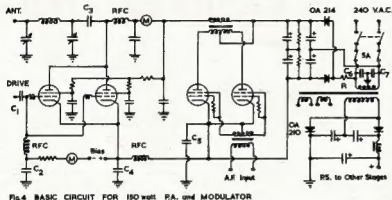
Fig. 4 shows the basic requirements for power supplies to a hypothetical transmitter running 120 watts to a pair of 807s, or even 150 watts to a pair of 6146s if you can afford them, modulated by a pair of similar valves in Class B. The important features are:—

1. The driver and modulation transformers act as "isolation" transformers between the mains and the normal sections of the transmitter, and must be of adequate insulation voltage rating for this purpose.
2. The r.f. input and output capacitors C1 and C3, and also the grid

by-pass capacitor C2, must be mica types of 2,500 volts d.c. rating, or 5,000 volts d.c. "test".

3. If possible use a link coupling to the antenna rather than a direct connection, thereby completing the isolation of the mains. Otherwise the capacitor C3 should not exceed 0.001  $\mu$ F.
4. A double-pole mains switch and double-pole fuses are recommended. With this arrangement it is immaterial which mains connection is "active" and which is "neutral".
5. The mains interference suppressors C6 and C7 must not be omitted because the silicon diode power supply takes almost a square-wave of current from the mains, in other words "hash" may be radiated from the mains wiring unless suppressed.
6. Resistor R limits the surge-current into the OA214s on switch-on, and should be at least 7 ohms, 14 watts. Follow the maker's recommendations.

The writer is at present developing a table-top transmitter along these lines and hopes to feature it in a future article.



See Editor's comment in text re use of an isolating transformer.

## ANTENNA CONSTRUCTION HINTS

DIETMAR KIESEWETTER,\* VK2APK

When building a Quad, the writer found the best way of connecting the rangoon canes (bamboo) to the boom was by three pieces of angle iron as shown in Fig. 1. The cross pieces of

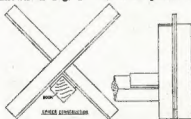


FIG. 1.

11" x 11" angle iron, 20" long, were welded together back to back; the third angle iron 11" x 11", 8" long, being welded underneath and sits on the boom. It is held by two steel angle brackets, the ends so bent that they can be screwed together. The bamboos were kept in position with the same type of brackets (Fig. 2).

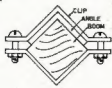


FIG. 2.

Before use, all iron parts should be painted with a zinc chromate metal primer. The centre of the boom rests in an angle iron bracket which is welded on the top of a water pipe socket the size of the supporting pipe (Fig. 3). Again the position of the boom is as-

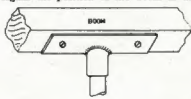


FIG. 3.

sured by two clamps as described before (Fig. 2) and some wood or machine screws. (For the writer's Quad the boom is made of 2" x 2" Pacific maple, 9 feet long.)

For a 6 metre four element beam, the 12 feet long boom is of dural, 11" square by 1" wall. The elements are held by home-made all-aluminium fittings, as shown in Fig. 4.

The Omega matching box (4 1/2" x 2 1/2" x 2 1/2") fits just underneath the driven element. Both tuning condensers and the co-ax connector are on the bottom side, to make protection against weather easier. The Omega rod (1/2" diameter) is spaced 12" centre to centre from the element, is drilled, tapped and screwed on the feed-through insulator on one side of the matching box.

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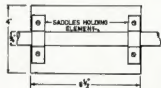
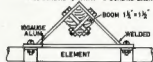


FIG. 4.

This antenna construction makes it possible to assemble and dismantle the antenna in a very short time and to carry it on the top of a car, therefore it is ideal for propagation tests and field days.

### WORLD CALL SIGNS

The Federal Treasurer has, as usual, bank numbers of "Call Book Magazine" for sale at £1 post paid, which is about one-third new price. These have been used by W.I.A. Federal Officers and are in near-new condition. Available are—America only: Jan. '30, Sept. '30, Jan., April, July, Sept. '31. World except America: Nov. '30, May and Sept. '31.

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\* 13 Fairmount St., Dulwich Hill, N.S.W.

# THE BEST BAND FOR V.H.F.

P. EDWARDS,\* B.Sc.(Hons.), VK7ZAJ

**A** GLANCE at the title of this article will probably be sufficient to raise the ire of many a v.h.f. man. Every Amateur has his favourite frequency band and most can find some argument to justify their choice.

Strictly speaking of course there is no best band for all purposes. So many factors are involved that it is in general impossible to make a choice of the optimum frequency. If we agree on a few basic matters however, the choice is quite easy. I shall attempt to show how to deduce the optimum frequency for a v.h.f. link operating to the optical horizon. I shall then give an answer to the following question:

What choice of frequency minimises the power output required by stations operating over a near-horizon path?

For (a) A "smooth" earth.

- (b) An undisturbed atmosphere (no ducts, etc.).
- (c) No ionospheric propagation.
- (d) No man-made noise, total noise being the sum of receiver and sky noise.
- (e) Frequencies between the 50 Mc. band and the 1,215 Mc. band.

Before explaining these assumptions I shall unashamedly admit that they are simplifications of real conditions. In practice things may often be quite different. However, by first restricting the problem it becomes easier to draw more general conclusions.

## PROPAGATION OVER THE EARTH'S SURFACE

The earth's surface acts as a reflector at v.h.f. and the reflected signal may partly cancel the direct signal. As a result signals exchanged by earth-bound Amateurs (this includes you) are generally weaker than they would be in space. In addition if the signal travels in the vicinity of the optical horizon, the bulge of the curved earth will obscure the view that either antenna has of the other. The result of all this makes the path loss not only greater than in free space but dependent on frequency and distance in a different way.

Neglecting the effect of distance for the moment, doubling the wave length will raise the signal transmitted between two dipole antennae in free space by one S point. If two stations are well within line of sight, however, the earth may be considered flat. In this case change of frequency has no effect on path loss at all, providing the frequency is less than about 10,000 Mc. Above this frequency atmospheric absorption sets in.

The signal from a station at the optical horizon will depend on frequency because of the earth's curvature, in fact it will drop by 4 db. (2.5X) every time the frequency is doubled. In

**★ The writer puts forward in a concise manner the effects of all factors governing the choice of a v.h.f. band. It is of particular interest in relation to satellite communication, and also has application in every-day ragchewing.**

general then the presence of the earth's surface makes the strength of a signal less dependant on frequency than in free space.

It will be seen later that the choice of optimum frequency does not depend critically on the path loss. Restrictions on antenna size are much more important and will be discussed in the next section. So far dipole antennae on a smooth earth have been assumed. Since most propagation paths lie over rough terrain the ground does not act as a mirror reflector. Over a rough earth the strength of the reflected wave is therefore reduced and results in an increase in signal strength above that expected for a path over the sea. Exact calculation of terrain effects is too difficult to carry out so we assume that the earth is smooth, bearing in mind the fact that what may appear to be a smooth earth to a 50 Mc. signal may in fact be "rough" at 576 Mc. Other things being equal this would mean a stronger signal at the higher frequencies.

## ANTENNA LIMITATIONS

In order to make a comparison between signal strengths at different frequencies it is necessary to specify the antennae to be used. The preceding discussion involved dipole antennae. A more realistic approach is to assume that the physical size of the antennae is fixed. Landlords, city councils, XYLs and car roofs being what they are, it is probably fair to limit the antenna in this way.

Now the power gain of an antenna of fixed dimensions (capture area) increases as the square of the frequency. That is, you gain one S point simply by changing from, say, 2 metres to 1 metre if you possess antennae for these bands of equal capture area. Suppose two stations were to conduct an experiment in which they exchanged signal reports on these two (or any other) bands. If both operators had built a set of antennae of area independent of frequency, then neglecting other considerations they would expect a rise of two S points (one S point at each end of the link) for every doubling of frequency. For example, in going from 50 to 576 Mc. the signal would increase from, say, S2 to S9 for the same radiated power. Although these figures apply only over a flat earth in the absence of noise, they indicate the importance of the antenna in determining the link performance at different frequencies.

## NOISE

In any communication system the presence of noise sets a lower limit on the readability of a signal. If the noise is impulsive (e.g. ignition) it may be possible to discriminate against it. The amount of man-made noise of this type obviously varies markedly from place to place and is therefore difficult to take into account. We shall assume that either man-made noise is absent or that it is possible to remove it by suitable techniques. At v.h.f. two sources of noise remain—the sky and the receiver.

## SKY NOISE

The galaxy, of which our solar system is a member, is a source of radio noise of extremely high intensity. The radio temperature of the sky depends both on frequency and direction. The most intense region coincides with the Milky Way and has a temperature exceeding 30,000° Kelvin at 50 Mc. This means that if a 50 Mc. antenna points at this region the amount of noise received will exceed that from a resistor (of the value of the antenna impedance) at this temperature. Now a good 50 Mc. receiver may have a noise figure of 3 db. The noise internally generated in this set is equivalent to the noise from the input resistor heated to a mere 300°. In other words the noise pick up is over 100 times that generated in the receiver. The effective noise figure in this case would therefore be more than 100 times (20 db.). The futility of trying to improve a hook up by reducing the receiver noise figure under these conditions is clear. Fortunately the Milky Way does not always get in the way of the signal. Also by going to a higher band the amount of sky noise may be cut to a very low figure.

## RECEIVER NOISE

Above 400 Mc. the highest sky temperature will be less than that of the earth (300 degrees). In this part of the frequency spectrum receiver noise becomes the limiting factor. Since we are concerned with equipment readily available to the v.h.f. Amateur we shall not consider masers or parametric amplifiers in this discussion. Instead we shall take as the sole contributor to receiver noise an ideal 6AK5 pentode working under optimum conditions. This noise figure is given in Table 1 for the various Amateur bands. As will be seen these figures can easily be obtained (and in some cases bettered) in practice.

Values of the maximum and minimum effective noise factors (taking sky noise into account) are also given. If the Milky Way passes across the antenna beam during the day the maximum values will be reduced somewhat at the lower frequencies because of absorption in the D layer of the ionosphere.

When comparing the values at different frequencies it should be borne

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In mind that noise factor and required radiated power are directly related. For a drop of 3 db. in e.n.f., transmitter power may be halved and the same signal-to-noise ratio maintained.

#### OPTIMUM FREQUENCY

To summarise briefly, we are attempting to find the frequency at which the various frequency-dependent factors combine to reduce the required radiated

u.h.f. This is, of course, a result of the high antenna gains obtainable. Comparing the 60 and 1,215 Mc. bands it can be seen that  $\frac{1}{2}$  milliwatt of radiated power at 1,215 Mc. will do the job of one watt at 60 Mc. There is one drawback, however—beam width. A 1,215 Mc. antenna of the same area as a 5 metre antenna with 10 db. gain would have a gain of 36 db. but a beam width of only a couple of degrees.

of the actual power required for various paths may also be worthwhile, but deserves a story of its own.

One of the interesting conclusions is the advantage of u.h.f. when antennae of the same size as those on the lower bands are used. With modern tubes the drop in transmitter efficiency at u.h.f. will be completely swamped by the increase in antenna gain.

If minimum input power is the criterion for the optimum frequency, the tables and graphs must be modified. In general the advantage of the higher frequencies will be reduced and the optimum frequencies will be slightly lowered.

**Table 1. Effective Noise Figures.**

Frequency (Mc.)	50	60	144	288	576	1215
E.n.f. (max.)	21	19	10.5	7.5	8.5	11
E.n.f. (min.)	11.5	10	5	6	8.5	11
Receiver n.f. (db.)	2	2	4	6	8.5	11

**Table 2. Relative Power for dipole to dipole horizon link.**

Relative Power:						
Max. (db.)	21	20	16.5	17.5	22.5	29
Min. (db.)	11.5	11	11	16	22.5	29

**Table 3. Relative Power for dipole to fixed aperture horizon link.**

Relative Power:						
Max. (db.)	23.5	20.5	10.5	5.5	4.5	5
Min. (db.)	14	11.5	5	4	4.5	5

**Table 4. Relative Power for fixed aperture horizon link.**

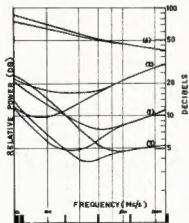
Relative Power:						
Max. (db.)	61.5	56.5	40.5	29.5	22.5	17
Min. (db.)	52.0	47	35	28	22.5	17

power to a minimum for a given path. The path we are considering is one close to the optical horizon. When these factors are mathematically examined it is found that the type of propagation path does not have a marked influence. The limitation on the antenna size, the external noise level and the receiver n.f. are the three important variables. Neglecting the first factor for a moment we have seen that since sky noise predominates at the low frequency end and receiver noise at the high frequency end, the sum of these is smallest at intermediate frequencies. If the antenna effect and the path loss to the horizon are fed into the calculation it is clear from the preceding discussion that the optimum frequency will be raised above that for which the n.f. is least.

Referring again to Table 1, the band for which the e.n.f. is lowest is the 2 metre band for minimum sky noise and the 1 metre band for maximum sky noise. These would be the optimum bands for dipoles well within line of sight. For dipoles at the optical horizon the situation is somewhat similar. Table 2 shows relative power (again in db.) for this case. The superiority of the 2 metre band is clear.

Now take a look at the graphs. Curve 1 shows the e.n.f. Curve 2 represents the figures in Table 2. Table 3 and Curve 3 show the situation where one station uses antennae of constant size while the other uses a half wave dipole for each band. Curve 3 would also apply if both stations used Yagis of constant length. The higher bands begin to come into their own! Table 4 and Curve 4 apply when both stations use constant aperture antennae. Here there is no doubt about the superiority of

Note that each of the four curves has two branches. The upper branch is drawn for maximum sky noise, the lower branch for minimum sky noise. The figures for the two branches of any one curve are directly comparable and they are given in the Tables. The vertical scale of the graphs is given in db. and it is compressed towards the top. The position of the curves on the graph is quite arbitrary. The figures have



simply been adjusted so that the curves do not pile up on each other. The scale figures are correct for Curve 1 and allow the e.n.f. to be read off directly in db. for any frequency.

In order to keep the article brief I have omitted mention of the relation between distance and power. Discussion

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# TRANSISTOR RADIOS\*

## DESIGN CRITERIA

For a specific receiver, the minimum battery voltage considered by the circuit designer is largely dependent upon the circuit configuration adopted in the audio output stage. (The various circuits will be described in future issues.) For the conventional transformer, coupled push-pull stage and the single-ended or transformerless output stage, the design criteria is that all stages of the receiver shall continue to operate normally when the supply potential has fallen to the minimum designed value—some two-thirds of its normal value.

To a first approximation the load on the battery constituted by the receiver may be considered as a fixed resistance. Consequently, when the supply potential falls to two-thirds of its nominal value the current consumption of the receiver will also fall to two-thirds of the nominal figure. The power consumption at this "end of life" point is therefore  $(2/3)^2$ , i.e. 44% of its original value. Since the a.f. output stage has the largest power consumption of any section of the receiver, it becomes clear that the circuit designer contends that the end user will replace the battery before the a.f. output power of the receiver has fallen to half its rated value and the increase in distortion with class B operation that this drop in supply potential entails.

Normally, the listener will request battery replacement before the arbitrary "end of life" point is reached because of inadequate volume, excessive distortion or both. Under extreme conditions, the local oscillator may cease to function over the entire tuning range, and obscure faults may appear to be present.

The fall in battery potential results in a smaller increase in distortion with the "split load" type of output stage (to be described in a future issue).

## END OF LIFE

The variation of terminal voltage with life, of the type of cell normally used in radio receivers, exhibits, after the initial "jump," a gentle decline for most of the working life, falling rapidly at the end of life. It is wise, therefore, to discard and replace any battery delivering as low as three-quarters of its nominal value on load, as in a comparatively short time it will have reached the end of life point manifesting in the receiver the effects previously discussed.

In contrast, the mercury cell maintains closely its rated terminal voltage throughout life, however, the higher cost factor does not normally permit its use in transistorised receivers.

## MEASUREMENT UNDER LOAD

Battery voltage measurements must always be carried out under load conditions, i.e. with the receiver tuned in to a local station and with the volume turned up to a reasonably high level for the type of receiver concerned. Of course, where battery replacement fails to ensure satisfactory operation, nor-

• This article is another of the series on transistor portable receivers and cordless radios. In this issue particular attention is given to problems associated with battery replacements and to the basic techniques of printed wiring.

mal fault-finding technique (to be described in later issues) must be applied.

## POLARITY OF SUPPLY

Where energisers are used the connections are made with flying leads having non-reversible contacts. With single cell supplies, the spring contacts are usually arranged so that contact will not be made unless the cell is correctly inserted.

Although reversing the polarity of the power supply may not destroy transistors of the alloy junction type, it could well result in a deterioration of performance.

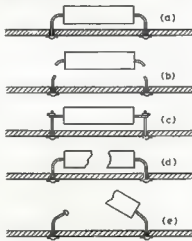


Fig. 1.

## PRINTED WIRING

Techniques now being encountered by service engineers include printed wiring, a term used to describe electrical circuits which take the form of thin copper strips on insulating board.

Since the techniques necessary in servicing printed wiring are somewhat different from those used in conventional circuitry, it is desirable for service personnel to acquire a thorough knowledge of the subject. There are a number of manufacturing processes including photocopy and offset printing and the following brief description of the most commonly used manufacturing process may help readers to become familiar with the technique.

## SILK SCREEN PRINTING

The circuit diagram is first rearranged so as to form a convenient flat layout which is photographed and

transferred to a silk screen. An acid resist paint is then squeezed through the screen to the copper surface, the painted areas representing the conducting surface required.

The board is then transferred to an acid etch bath where the unwanted copper is removed. After etching, the acid resist is removed and the board thoroughly cleaned. It is then provided with a protective layer of flux so that it may be stored without tarnishing. The board is now ready for component insertion through pre-punched holes.

## IMPORTANCE OF PRINTED WIRING

Once a correct layout is achieved in printed wiring, all further models are identical. The complete item is compact, lightweight and reliable. Components are easily added by automatic methods and high production rates are possible.

## TYPES OF PRINTED WIRING

Individual manufacturers use different techniques of printing, but the boards will all have much the same appearance. In some processes, the circuit is not etched but punched out of foil and attached to the board. This method is slightly more expensive than the more usual etching process. In others, the bituminous coating is not applied, the ink resist being sufficient for most requirements. Sometimes the wiring printed on to both sides of the board.

Where the printing technique includes printed inductors, capacitors and resistors, the name "printed circuit" is more correctly used.

## CARE OF BOARDS

The preceding information should assist in appreciating the precautions which are necessary when servicing printed circuits.

The "wiring" produced on the laminate boards is extremely thin—about 0.0015" to 0.003"—and is bonded to the board. Flexing the board will result in the foil being stretched and the strain may fracture the copper, thus forming hairline cracks in the conductor.

When connections are made to the foil, great care must be taken to prevent excessive heat from melting the adhesive and damaging components. A 25w. soldering iron will be quite sufficient to effect repairs and, if applied only long enough to melt the solder, should not damage the circuitry.

Acid fluxes should not be used on printed wiring; however, the more common cored solders do not contain this type of flux.

## CIRCUIT TRACING

Due to the single-plane layout used in printed wiring, circuit tracing is somewhat simplified. The components are not normally on the same side of the board as the wiring, however the problem of locating components when fault-finding may be obviated by placing the board in front of a bright lamp.

(Continued on Page 13)

\* Reprinted from "Mullard Outlook," March-April and May-June, 1961.

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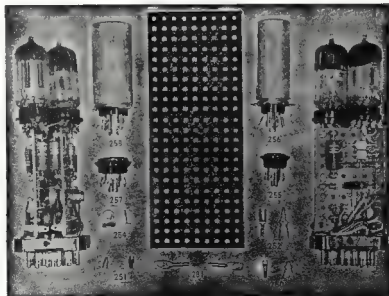
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# Noise Factor of Some V.H.F. and U.H.F. Glass-Base Valves\*

G. R. JESSOP, A.M.Brit.I.R.E., Assoc.I.E.E. (G6JP)

**D**URING the past few years Amateurs and professional Radio Engineers have spent a great deal of time and effort in searching for ways and means to improve the input stages of converters and receivers for the 2m and 70cm bands. Each new valve type that has been released has been given a very thorough testing in one way or another and the results have been reported from time to time, often with outstanding noise performance claims. Some such claims are even to be found in advertisements appearing in Amateur

at 45 Mc.† while the potential introduction of television in the higher frequency bands in the region of 400-1,000 Mc. has prompted work on valves and measurements for this range. The latter has, of course, had a marked bearing on the economic aspects of v.h.f./u.h.f. valve design. So much so, that the glass base form, which is always cheaper than the disc seal style, has made such advances as to be a strong competitor to the disc seal type for use below 1,000 Mc. except where wideband amplifiers are required.

The following comparative figures of noise factor from Fig. 1 are interesting:

Valve	45 Mc.	145 Mc.	430 Mc.
6AM4	2.4	5.9	10.2
417A	2.1	4.9	8.7
A2521/ A2599	1.4	3.8	7.0
A1714	1.9	4.5	8.2

It is clear from this data that the best u.h.f. triodes on glass bases are available in the U.K.

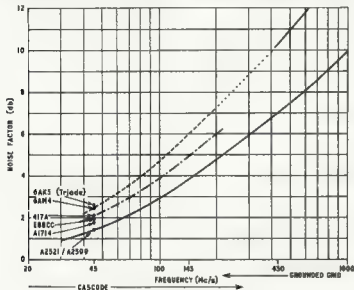


Fig. 1. Graph showing the variation of noise factor with frequency for some of the better valves for use in r.f. stages.

Radio periodicals. Very little real data, however, appears to have been published regarding the noise factors of the valves produced by the various makers and the purpose of the information presented in this article is intended to clarify this somewhat unsatisfactory state with some comparative information recently made available to the writer.

No doubt some of the claims that have been made in the past have been due to the belief that a thermionic diode noise generator, like a camera, "cannot lie." The noise generator is capable of repeating its results, but they will not necessarily be correct. In fact, a considerable amount of work has had to be done in recent years to obtain agreement between one establishment and another, let alone between one country and another.

The need for very low noise i.f. amplifiers for radar and other applications has helped in the production of reliable methods of noise factor measurement

Readers will probably have seen noise factors claimed in some advertisements which are theoretically unattainable. These are probably due to the 'noise measuring apparatus being even more optimistic than that used by the writer! The valves on which measurements have been made using the same apparatus are shown in Table 1.

These figures, together with the curve of Fig. 1, give a fair picture of the performance of valves available at present.

From Table 1 it can be seen that a valve such as the 417A, which was designed for wideband applications, is a significantly poorer performer than the A2521-A2599 valves which were designed specially for u.h.f. input stage service.

\* It has now been agreed by the industry and Services that this frequency should be 45 Mc for future tests.

Valve Type	Origin	Noise Factor at 45 Mc.
ECC85	Holl'd	2.5
E180F (as pentode)	Holl'd	3.5
D3A (as triode)	Holl'd	2.8
" (as triode)	Germ.	2.4
6AM4 (u.h.f. triode)	Germ.	2.0
6AJ4 (u.h.f. triode)	U.S.A.	2.4
6AK5 (as triode)	U.S.A.	2.4
417A (wideb'd triode)	U.S.A.	2.5
6CW4 (narrowb'd tri.)	U.S.A.	2.1
E88CC (double triode)	U.S.A.	2.1*
A1714 (u.h.f. triode)	U.K.	2.0
†A2521 (u.h.f. triode)	U.K.	1.9
‡A2599 (u.h.f. triode)	U.K.	1.4
† U.S. type 6CR4		1.4
† U.S. type 6CT4		1.4

Table 1.



Lionel VKKCS and Vic VKKVL at the Gosford Field Day on 28th February.

## 24th B.E.R.U. CONTEST RESULTS

The following were the placings of Australian stations in above Contest:

HIGH POWER SECTION			
Posn.	Call Sign	Pts.	Contacts
12	VK8SU	2460	205
25	VK3NQ	2035	199
26	VK2ZW	2015	175
53	VK1APK	1290	122
67	VK3VN	690	72
77	VKXJ	780	48
84	VK3MT	610	43
92	VK4SD	360	31
99	VK9OW	945	13
	*VK8RK	145	26
	*VK8RK	115	11
* Invalid No declaration.			
LOW POWER SECTION			
Posn.	Call Sign	Pts.	Contacts
8	VK7EM	1280	83
9	VK4SS	880	64
10	VK3CC	830	50
12	VK3CK	700	56
17	VK3RJ	364	17
18	VK7RY	126	7



# \* AEGIS

PERMEABILITY TUNED

## Coil Former Assembly

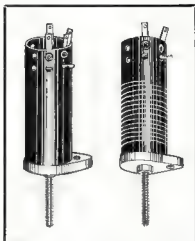
AS ILLUSTRATED . . .

The "Aegis" type H.U.4 Permeability Tuned Coil Former assembly can be supplied either plain or grooved (at approximately 16 turns per inch). Complete assembly consists of a high quality bakelised paper former,  $1\frac{1}{2}" \times \frac{3}{4}"$  diameter 4 cadmium plated eyelet lugs,  $\frac{3}{4}" \times \frac{3}{4}"$  carbonyl iron core, adjustable through the moulded, mechanically strong plastic base. Requires two mounting holes at  $7/16"$  centres (one  $11/32"$  diameter, the other  $\frac{1}{4}"$  diam.). Overall height above chassis when mounted  $2-5/16"$ .

### PRICE:

Grooved . . . .	4/8 each	plus Sales Tax	} Slightly higher in W. Aust. & Q'land
Ungrooved . . . .	4/- each	plus Sales Tax	

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  - ☐ TRANSISTOR TRANSFORMERS
- (Mark X in square)

# National Field Day Misadventure

## TRANSISTOR RADIOS

(Continued from Page 9)

With the National Field Day approaching, great plans were made by VK2 Stations, viz., Sid VK2SW, Pierce VK2APQ, Ted VK2FE, Roy VK2KO, Ron VK2ZRM, and Ron WIA-L2025 in anticipation.

Equipment, tucker, location, etc., were gone into with fantastic detail, the major decision from all the meetings being the selection of Roy VK2KO as "Greasy"—beg your pardon!—Kook.

Anyway, came the day. Bright and early three car loads of miscellaneous started south, the leading car carrying Ted VK2FE and Roy VK2KO got as far as Tom Ugly's Bridge and "bang!!" A trailer tyre blown to smithens and no spare!

With great determination and fortitude the party scouted the hills of Hurstville trying to purchase a second-hand tyre and tube—19". What!! (Noah used this size as bollards on the Ark.) After 1½ hours' search, Roy VK2KO located one. He's still crying about the price he paid.

Proceeding onward after repairs had been effected, the party arrived at their destination, being a mountain peak nine miles south of Macquarie Pass, and proceeded to set up camp. Other than losing pints of blood to leeches, extracting thorns, plus a twisted ankle, tents and antennae were erected.

Power supplies and radio equipment were installed and then the fun started! "Sid!! You do have to filter 522 generators! They do push out a bit of QRM!!" "And take the blasted thing from under my chair!"

The noise was terrific—three engines belting away—four raucous voices calling CQ! Brother!! Aspro will ease it!

Ten o'clock Saturday night the rot set in. Sorry, it set in earlier, "belch!!" Roy outdid himself and nearly "did" everyone else with his steak, chips and egg tea. "You beauty!" "Didn't know

it took 4 lbs. of dripping to cook 4 lbs. of steak and 8 eggs." "Ya learn every breath ya take!" "Belch!!" "Who called the cook a —?"

Anyway at ten o'clock, a terrific clutter announced that one "donk" had broken its crankshaft. To add fuel to the fire, the 40-80 metre rig went bad and was not immediately repairable. "Will I tell 'em what was wrong with it, Ted?" Blush!!



Sid VK2SW with Pierce VK2APQ in the background.

"Fatty," sorry, Pierce VK2APQ, had a whale of a time on 2 metres, working a total of 45 stations with an average report of 5 and 7 to 8 into Sydney—and he's still crowing.

Ron VK2ZRM did a terrific job on antennae and washing greasy dishes, whilst Ron WIA-L2025 was plant engineer and worked like a Trojan keeping power up to the operators.

Sunday evening saw six weary, dirty, but nevertheless happy Hams wending their weary way homeward, vowing that next year they would really be prepared and give the VK3 boys a blooming run for their money!

Some manufacturers print component references on the same side of the laminate as the wiring, and this of course simplifies circuit tracing.

The use of service information is the best solution; most service sheets include a drawing of the board as it will be seen during servicing, with component references clearly marked.

### FAULT-FINDING

Most boards are coated with an insulant after manufacture, therefore, care must be taken to achieve proper contact with the copper foil. The insulant serves not only to prevent accidental short-circuit of the exposed foil to other parts of the circuit, but also helps to reduce oxidation.

The protective coating must be removed from the measuring points before any connection can be made—acetone applied with a soft cloth or brush will serve this purpose.

The detection of hairline cracks in the foil is facilitated by the use of a powerful lamp and a magnifying glass.

### COMPONENT REPLACEMENT

Faulty components should be removed with great care. Flexing the laminate, peeling the foil or dropping solder on to the remainder of the circuit should be avoided.

### SMALL COMPONENTS

Transistors, capacitors and other components may be removed as illustrated in Fig. 1. The leads should be cut as close to the component as possible. The wires left on the board should be cleaned and the leads of the new component looped around them as shown in (c). Solder may then be applied, care being taken to ensure that the heat does not damage the board or component, or melt the solder under the board.

Should the cutting of the leads be too difficult, it may be possible to cut the component in half as shown in Fig. 1 (d). The parts remaining on the leads should be removed and the leads cleaned as in Fig. 1 (e). The new component can then be added as before Fig. 1 (c).

### LARGE COMPONENTS

Audio and i.f. transformers may be removed by heating the soldered connections then lightly brushing-off the solder with a stiff brush. A bristle or camel-hair brush is also suitable but may not survive many operations. Alternatively, a sharp-pointed metal rod, such as a scriber, may be used to pick off the molten solder. With any of these methods, the splashing of solder on to other parts of the circuit must be avoided.

(To be continued.)

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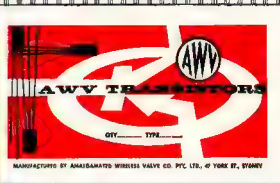
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- AWV leads in Australia.



**VALVE CO. PTY. LTD.**

**PERTH ADELAIDE**

## Amateur Radio, April, 1962



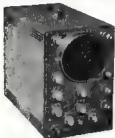




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# SIDE BAND

Phasing, Xtal Filters, Balanced Mod., Linear Amps, Vox  
 Sub Editor: BUD POUNSETT, VK2AQJ,  
 6 Alice Street, Queanbeyan, N.S.W.  
 ADDRESS CORRESPONDENCE FOR THIS PAGE DIRECT TO THE SUB EDITOR

### S.S.B. AT 288 Mc.

While quite a large number of the Australian Amateurs have got yet transmitted on s.s.b. signal on such d.c. bands as 80 or 40 metres, Lance 3AHL is a long way ahead with equipment capable of producing sideband on 288 Mc. There are quite a few stations on 50 and 144 Mc., but Lance's is the only s.s.b. station on 288 Mc. in the Melbourne area, if not in the whole of the country.

Fig. 1 shows a block diagram of the 3AHL 288 Mc. system. The 50 Mc. sideband tx is used to drive the CV5116 mixer where a 288 Mc. signal from an impressive number of multipliers and amplifiers, heterodynes the s.s.b. to 288 Mc. The 40 metre equipment is v.d.o. controlled resulting in the same rate of change in frequency at 288 Mc. In fact, the stability of the 288 Mc. signal is the same as that obtained in the 80 to 144 Mc. Franklin v.f.o. used in the 50 Mc. gear.

You will also note that the 288 Mc. signal is used in the receiver converter to change the 288 Mc. signal to 38 Mc. for use in another converter and thence to a communications receiver.

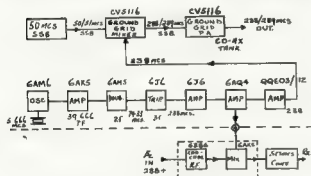


Fig. 1—VK3AHL 288 Mc. S.s.b.

Some of the tubes used may not be familiar. The converter cascade r.f. stage uses a 6BS6 which is similar to a 6BK7, and the CV5116 is equivalent to the 6CT5 350000 tube. As a full treatment of the circuit would entail a large amount of preparation, Lance will be glad to reply to any queries and to furnish details of any part of the circuitry in which you may be interested.

### THE 6B8U PRODUCT DETECTOR

Much cheaper than the excellent 7360 tube is the 6B8U which makes a good product detector. Fig. 3 shows the simplified circuit of the 6B8U product detector which appeared in "CQ" Aug. 1959. The method of coupling the oscillator output to the 6B8U is my own. Using the 6B8U tube in this role has three big advantages over the usual 12AU7/6BE6 product detectors. The i.f. input does not have to be attenuated, the b.f.o. injection is very efficient, and the output is more than sufficient to drive the audio output tube without the need for an audio voltage amplifier. You are probably wondering about the cathode follower output from the oscillator. I found that when taking the output from the grid or plate of the oscillator tube, the b.f.o. frequency varied with s.s.b. input to the 6B8U, thus giving rise to distorted audio output. Placing a 1,000 ohm  $\frac{1}{2}$  watt resistor in the cathode circuit of the oscillator tube and coupling the b.f.o. signal with a 0.001  $\mu$ F. capacitor to the 6B8U control grid resulted in clean undistorted audio output. In my case, the oscillator circuit is that used in the 6B8U receiver, the frequency is 85 Kc., and the tube is half of a 12AU7.

### PORTABLE VK3

Well known Melbourne sidebander, Ron Harrison, has recently been moving around New Guinea, appearing in such places as Lee, Mt. Hagen, Misaki, Werak and Port Moresby,

Ron has been installing radio equipment for the airline for whom he toils. He took along his mobile equipment which performs so well on 30 metres from the streets of Melbourne and suburbs and has been kept busy handling out VK3AHL/VK3 contacts with the aid of a simple dipole. At the time of writing, Ron had not yet appeared in Port Moresby so, for those who need Papua (and who doesn't?), keep your ears peeled for Ron on the high end. One amusing sidelight, was an American who asked Ron to rotate his antennas "Jeeves, pull up that coconut palm and plant it again over there."

### THE AUSTRALIAN S.S.B. RECIPE

Compe Daw, VK2EF, has gone to a lot of trouble to compile a very interesting booklet giving details of who is on s.s.b. in Australia. The book lists the call, name, location and equipment (receiver and transmitter) of the 230 or so sideband operators in this country. Maybe Compe has missed a few of the names, some of his entries have blanks in them, so how about letting him know the details, very briefly, of your gear. Compe is very active

will contain the mechanical details. The LWM-3 is an s.s.b. transceiver employing 33 tubes and a Collins 2.1 kc. mechanical filter or an alternative full lattice crystal filter may be substituted. All bands from 3.3 Mc. to 30 Mc. are covered in eleven 30 kc. segments.

The LWM 3 delivers 3 watts p.e.p. ample to drive a pair of 6146 tubes or similar linear amplifier. This transceiver looks very similar in appearance to the Collins KW40 and the construction is not beyond the advanced Amateur with a reasonable workshop.

Address your inquiries to Editor "A.R." who has the above bulletin. It may be possible to post it on a round robin.

### WKO

Steve VK0VK made DKCC from Wilkes in 1961 using the same gear now used by VK0DB. VK1SB is back on 30 mx. much to the delight of the DX. Stan is the only VK1 on 30 and is much sort after for W.A.V.K.A. and W.P.K. I knew he would not be long on 40 mx. only.

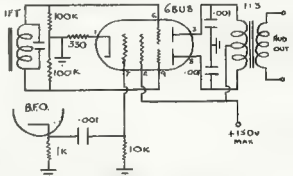


Fig. 2—Simplified 6B8U Product Detector.

on the bands, but if you miss working him, write the information on the back of a QSL and drop it in the mail. The address is VK2EF, P.O. Box 44, Gawler, S.A.

This year could be a lean year for VK0 contacts, although this will not be the case of Don ZIE, who is signing VK0DS until next January. Don is an ionospheric physicist at Wilkes and when not going about his official duties, will be on 30 mx. using the modified KW51 and 73A4 combination that did such a sterling job for the chaps last year. A ground plane radiator the signal which often has that polar null on it. Here again single sideband shows to very great advantage. A.m. signals rapidly lose their intelligibility under these latter conditions.

Another call you will hear from Wilkes is VK00C, while from Mawson VK00W is expected, although it is understood that s.s.b. equipment is not available at this base. At Macquarie Island there is believed to be some Amateur activity but again not on sideband; the call sign is not known at present either. Contrary to what one or two overseas journals have stated, there is definitely no Amateur activity from Heard Island nor can any be expected as the island is uninhabited except for seals, sea elephants, penguins and the like.

At Wilkes just a hundred yards or so from VK00S, the American personnel of the base operate KX0AAC on s.s.b., mostly in phone-patches to their families and friends in the United States. What a wonderful boost for the Australians in the Antarctic, if this facility was available to them.

### FREE NEWS

The Nov.-Dec. 1961 issue of G.E. Ham News gives circuit details of a very fine piece of home-grown equipment. The Jan.-Feb. issue

As we anticipated last month, Col Harvey, ex-VK2AQU, is now on from Singapore, signing V81AU, and is on or about 14,300 Kc. from 1900 to 1900 G.M.T., almost every evening. Col. who is a Wing Commander in the R.A.A.F., is on loan to Far East Air Force Headquarters, R.A.F. based at Chual and is expected to be there for two years or so.

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Sub Editor: ROBERT YOUNG, WIA-L3078.

14 Alverna Grove, Brighton, Victoria

ADDRESS CORRESPONDENCE FOR THIS PAGE DIRECT TO THE SUB EDITOR

## VICTORIA

Last general meeting of the Group, 14 members were present. It was suggested by members to make a recording of the S.W.I. Section of the b.c. from Warrnambool on week-end of the Convention, the recording was made on Saturday night. It was transmitted on 80 mhz from 3FX to 3OM and re-broadcast from 3W1/Portable on Sunday morning.

At construction nights, it was suggested by Maurice Cox to construct simple radio gear such as single-tube converters to feed into b.c. sets. The younger members can afford to build this gear, and will also get them interested in the listening side of radio.

Ian Lloyd has arrived back in Melbourne from VK1 and has his nose back to the grindstone once again. He has managed to find some time for a little DX hunting and has improved his DX total a small amount, but has heard no new countries.

Noel L3101 has not had the opportunity to do a great deal of listening this month. 20 mc has been fair to W land in early morning via the long path, and has been much better from 18th Feb. The 40 and 80 mc bands have not been the best. At present Noel is building a W8K antenna and with a bit of luck it should be operational by the end of the month. He needs to move the rx up into the spare bedroom for the winter months and settle down to some solid listening to boost his score.

Ma-rie L3068 is still listening to Ma-rie DX on 20 and 18 mx and is still waiting for an opening on 18 mx (wish you luck, Oxfi). He has wired up a speaker and headphone network so as either the H.R.O. or the BC368 can work into the one speaker. He is thinking seriously of disposing of the vee beams and erecting two 80 mx Windoms. Also he may make his mast up a ground plane antenna for 10 mx. Cards request DUCU, CANVA, LASID, KE1CV/XFA VK9OP.

Ken L3117 has not been able to attend the meetings because of the transport problem. He was hoping to attend the Convention, but his parents disapproved. The rx line-up at Ken's QTH is a Philips No. 4 with an extra audio stage and several other modifications. The antenna consists of two folded dipoles, one for 7 Mc. and the other for 14 Mc. The shack is made of corrugated iron sheeting and is about

8 ft. square by 7 ft. high. Ken reports that 80 mx is opening up for DDC now that winter is coming on.

## TASMANIA

Activities are very quiet according to Neville TZEK/L7013, who has been away for two weeks, therefore very little DX was heard. He is active on 2 mx also. David TZAY has been practising c.w. and will sit for his full licence soon. He has been hearing some good signals on c.w. with his new 335A. Also

Ted TEB has recently purchased a HC454 which is working really well. He is planning some modifications to it so as he can hear the rare DX.

Greg Johnston has been away most of the last month and has not been very active.

## EARTH DATA

The mail this month is from the following listeners: Peter Dreyer, Chas Abernethy, Eric Treibkock, Peter Field, and Doc Gantley.

Peter L6081 has found 30 mx very good every night from Asia and Europe and good in the mornings to U.S.A. During the month Peter heard his first ZS and VO on 40 mx phone, also Europeans were heard at 1900 G.M.T. on 40 mx as well as two ZS stations. One new country confirmed by Peter was KE1HHT. Cards received by Peter during the month: ZL1IB VK5DC (7 Mc. s.a.b. mobile).

WERO. XEHTX  
 Chas. LEBL reports that conditions for the  
 West Coast were perfect for most of  
 the four weeks. In fact he has not listened  
 on h.f. since Nov. 1961. He has sent out 38  
 QSL's and received 15. LEBL has received  
 which include three ZL's. LEBL has received  
 the four ZL districts and now has the four  
 confirmed. He is wearing it. He is the first  
 to have four ZL districts confirmed. The  
 50 Mc. Chas. missed out on the elusive VK3  
 and VK5, and would have liked to have col-  
 lected for the Elizabeth Award and is now waiting  
 on confirmation while all the logging is taking  
 place. Chas. is not planning on continuing us-  
 ing up the DX ladder, but Chas. has no in-  
 tention of leaving 50 Mc. for quite a while yet.  
 Chas. is planning to continue on 100 Mc. in  
 March: BVJUSE, JZJDM, QWAW (3.5 Mc.),

UASMO, URIDZ, HLEKT, KXSAJ, UP2KNP and VQSHZ. Eric is very interested to know from which source did Bill John (Feb. "A.R.") receive a QSL card from ZLSAI. He has had no luck as yet with this one.

Peter L5039 sends his DX QSL cards received this month. They are from JA1ENI, UR2BU, UA0QZ, UA3MM/M, KATRY, FB0B, VR1F, CT1VE, DL1IN, ZL22, ZL24, ZL25, ZL26, ZL27, ZL28, ZL29, ZL30, ZL31, ZL32, ZL33, ZL34, ZL35, ZL36, ZL37, ZL38, ZL39, ZL40, ZL41, ZL42, ZL43, ZL44, ZL45, ZL46, ZL47, ZL48, ZL49, ZL50, ZL51, ZL52, ZL53, ZL54, ZL55, ZL56, ZL57, ZL58, ZL59, ZL60, ZL61, ZL62, ZL63, ZL64, ZL65, ZL66, ZL67, ZL68, ZL69, ZL70, ZL71, ZL72, ZL73, ZL74, ZL75, ZL76, ZL77, ZL78, ZL79, ZL80, ZL81, ZL82, ZL83, ZL84, ZL85, ZL86, ZL87, ZL88, ZL89, ZL90, ZL91, ZL92, ZL93, ZL94, ZL95, ZL96, ZL97, ZL98, ZL99, ZL100, ZL101, ZL102, ZL103, ZL104, ZL105, ZL106, ZL107, ZL108, ZL109, ZL110, ZL111, ZL112, ZL113, ZL114, ZL115, ZL116, ZL117, ZL118, ZL119, ZL120, ZL121, ZL122, ZL123, ZL124, ZL125, ZL126, ZL127, ZL128, ZL129, ZL130, ZL131, ZL132, ZL133, ZL134, ZL135, ZL136, ZL137, ZL138, ZL139, ZL140, ZL141, ZL142, ZL143, ZL144, ZL145, ZL146, ZL147, ZL148, ZL149, ZL150, ZL151, ZL152, ZL153, ZL154, ZL155, ZL156, ZL157, ZL158, ZL159, ZL160, ZL161, ZL162, ZL163, ZL164, ZL165, ZL166, ZL167, ZL168, ZL169, ZL170, ZL171, ZL172, ZL173, ZL174, ZL175, ZL176, ZL177, ZL178, ZL179, ZL180, ZL181, ZL182, ZL183, ZL184, ZL185, ZL186, ZL187, ZL188, ZL189, ZL190, ZL191, ZL192, ZL193, ZL194, ZL195, ZL196, ZL197, ZL198, ZL199, ZL200, ZL201, ZL202, ZL203, ZL204, ZL205, ZL206, ZL207, ZL208, ZL209, ZL210, ZL211, ZL212, ZL213, ZL214, ZL215, ZL216, ZL217, ZL218, ZL219, ZL220, ZL221, ZL222, ZL223, ZL224, ZL225, ZL226, ZL227, ZL228, ZL229, ZL230, ZL231, ZL232, ZL233, ZL234, ZL235, ZL236, ZL237, ZL238, ZL239, ZL240, ZL241, ZL242, ZL243, ZL244, ZL245, ZL246, ZL247, ZL248, ZL249, ZL250, ZL251, ZL252, ZL253, ZL254, ZL255, ZL256, ZL257, ZL258, ZL259, ZL260, ZL261, ZL262, ZL263, ZL264, ZL265, ZL266, ZL267, ZL268, ZL269, ZL270, ZL271, ZL272, ZL273, ZL274, ZL275, ZL276, ZL277, ZL278, ZL279, ZL280, ZL281, ZL282, ZL283, ZL284, ZL285, ZL286, ZL287, ZL288, ZL289, ZL290, ZL291, ZL292, ZL293, ZL294, ZL295, ZL296, ZL297, ZL298, ZL299, ZL300, ZL301, ZL302, ZL303, ZL304, ZL305, ZL306, ZL307, ZL308, ZL309, ZL310, ZL311, ZL312, ZL313, ZL314, ZL315, ZL316, ZL317, ZL318, ZL319, ZL320, ZL321, ZL322, ZL323, ZL324, ZL325, ZL326, ZL327, ZL328, ZL329, ZL330, ZL331, ZL332, ZL333, ZL334, ZL335, ZL336, ZL337, ZL338, ZL339, ZL340, ZL341, ZL342, ZL343, ZL344, ZL345, ZL346, ZL347, ZL348, ZL349, ZL350, ZL351, ZL352, ZL353, ZL354, ZL355, ZL356, ZL357, ZL358, ZL359, ZL360, ZL361, ZL362, ZL363, ZL364, ZL365, ZL366, ZL367, ZL368, ZL369, ZL370, ZL371, ZL372, ZL373, ZL374, ZL375, ZL376, ZL377, ZL378, ZL379, ZL380, ZL381, ZL382, ZL383, ZL384, ZL385, ZL386, ZL387, ZL388, ZL389, ZL390, ZL391, ZL392, ZL393, ZL394, ZL395, ZL396, ZL397, ZL398, ZL399, ZL400, ZL401, ZL402, ZL403, ZL404, ZL405, ZL406, ZL407, ZL408, ZL409, ZL410, ZL411, ZL412, ZL413, ZL414, ZL415, ZL416, ZL417, ZL418, ZL419, ZL420, ZL421, ZL422, ZL423, ZL424, ZL425, ZL426, ZL427, ZL428, ZL429, ZL430, ZL431, ZL432, ZL433, ZL434, ZL435, ZL436, ZL437, ZL438, ZL439, ZL440, ZL441, ZL442, ZL443, ZL444, ZL445, ZL446, ZL447, ZL448, ZL449, ZL450, ZL451, ZL452, ZL453, ZL454, ZL455, ZL456, ZL457, ZL458, ZL459, ZL460, ZL461, ZL462, ZL463, ZL464, ZL465, ZL466, ZL467, ZL468, ZL469, ZL470, ZL471, ZL472, ZL473, ZL474, ZL475, ZL476, ZL477, ZL478, ZL479, ZL480, ZL481, ZL482, ZL483, ZL484, ZL485, ZL486, ZL487, ZL488, ZL489, ZL490, ZL491, ZL492, ZL493, ZL494, ZL495, ZL496, ZL497, ZL498, ZL499, ZL500, ZL501, ZL502, ZL503, ZL504, ZL505, ZL506, ZL507, ZL508, ZL509, ZL510, ZL511, ZL512, ZL513, ZL514, ZL515, ZL516, ZL517, ZL518, ZL519, ZL520, ZL521, ZL522, ZL523, ZL524, ZL525, ZL526, ZL527, ZL528, ZL529, ZL530, ZL531, ZL532, ZL533, ZL534, ZL535, ZL536, ZL537, ZL538, ZL539, ZL540, ZL541, ZL542, ZL543, ZL544, ZL545, ZL546, ZL547, ZL548, ZL549, ZL550, ZL551, ZL552, ZL553, ZL554, ZL555, ZL556, ZL557, ZL558, ZL559, ZL560, ZL561, ZL562, ZL563, ZL564, ZL565, ZL566, ZL567, ZL568, ZL569, ZL570, ZL571, ZL572, ZL573, ZL574, ZL575, ZL576, ZL577, ZL578, ZL579, ZL580, ZL581, ZL582, ZL583, ZL584, ZL585, ZL586, ZL587, ZL588, ZL589, ZL590, ZL591, ZL592, ZL593, ZL594, ZL595, ZL596, ZL597, ZL598, ZL599, ZL600, ZL601, ZL602, ZL603, ZL604, ZL605, ZL606, ZL607, ZL608, ZL609, ZL610, ZL611, ZL612, ZL613, ZL614, ZL615, ZL616, ZL617, ZL618, ZL619, ZL620, ZL621, ZL622, ZL623, ZL624, ZL625, ZL626, ZL627, ZL628, ZL629, ZL630, ZL631, ZL632, ZL633, ZL634, ZL635, ZL636, ZL637, ZL638, ZL639, ZL640, ZL641, ZL642, ZL643, ZL644, ZL645, ZL646, ZL647, ZL648, ZL649, ZL650, ZL651, ZL652, ZL653, ZL654, ZL655, ZL656, ZL657, ZL658, ZL659, ZL660, ZL661, ZL662, ZL663, ZL664, ZL665, ZL666, ZL667, ZL668, ZL669, ZL670, ZL671, ZL672, ZL673, ZL674, ZL675, ZL676, ZL677, ZL678, ZL679, ZL680, ZL681, ZL682, ZL683, ZL684, ZL685, ZL686, ZL687, ZL688, ZL689, ZL690, ZL691, ZL692, ZL693, ZL694, ZL695, ZL696, ZL697, ZL698, ZL699, ZL700, ZL701, ZL702, ZL703, ZL704, ZL705, ZL706, ZL707, ZL7

A fox beam has been up since Xmas  
Don LSG86 has now reached the century in  
countries confirmed - a card from KH9ED.  
Kure made the above possible. The following  
are also good news cards to start  
the second century, 33 countries have  
heard in 33 zones in 1982 to date. Plenty of  
We have heard on 80 mc c.w. mid even-  
ing, mainly being worked by SGL7, M.C. c.w.  
on 80 mc c.w. on 80 mc c.w. maxed out  
pleasing is the DX coming through on 15 mc  
at 9 p.m. on 32/3/82, 30 mc was also very  
good at the same time. Don logged VPESY for  
Vincept, Wafar, India QTH is P.O. Box 83, SL  
Vincept, Wafar, India

Well chaps, that's all for this month, and will be looking for more news from you next month. 73, and best of DX—Robert. L3078.

### S.W.L. DX LADDER FOR APRIL

	Countries Conf. Hrd.	Zns Conf.	Sab. Conf. Hrd	W. St.
E. Trebilcock	274	280	40	—
D. Grandtley	104	345	37	14 81
A. Wescott	80	158	31	33 89
B. Ward	40	200	33	— 14
M. Cox	41	210	32	8 218
C. Abernethy	30	87	31	— 23
F. Drew	38	173	18	7 78
R. Fields	38	233	—	— 23
N. Harrison	36	48	20	— 23
I. Thomas	17	131	18	8 70
D. Jenkins	16	345	8	1 28
H. G. B. Jones	8	185	3	— 27
N. Fisher	3	26	3	— 27

the top 50 or 100 is a mad house but at least there's plenty of activities. I've just returned from a world tour and spent some time with my dear friends in the Arab world and they just operate where they wish with most satisfactory results. At least their hands are busy—in sharp contrast to the Australian scene. Let's point that c.w. is international is really too silly for reply. Listen to any of these average people coming from swapping SST numbers and the plea for QSL for all over the shouting. It is the most impersonal means of communication I know.

"Tubby" vice, too, says these market surveys are the best. He is the boss. Here, I can speak with quite a good deal of authority as an executive in perhaps the most competitive industry in the world today. We rely on market surveys completely and without them we would all be out of business, especially when such huge capital investment is at stake. To say these figures of mine were the same as equivalent figures of mine is a confidence within. Honouring they were taken independently by a very well-qualified researcher with degrees in economics from three countries behind him.

It is quite obvious from what has already been published and what I hope will be published in the future that there is a genuine desire for a vote on the subject whether the c.w. activities should be curbed. One only has to listen any day of night and note the complete absence of any action on the c.w. end. Those who are so prolific in their replies to me, these minority who are on c.w. quite regularly, but who do not seem to be so outspoken in their defence that rise to put the claim of the c.w. world. Let us hear from more, whom, I hope, are balanced like myself in wishing to see justice and democracy prevail.

Like the Swiss, only facts convince me.  
—Beth Jones, VIKING

## Correspondence

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publishers.

"INCREASED AUDIO WITHOUT SPLATTEE"

Editor "A.R.," Dear Sir,  
The article "Increased Audio Without Splatter" in the March issue of "Amateur Radio" has left me (amongst, I should hope, a considerable number of others) dismayed and shocked.

Disappointed, Sir, that your Technical Committee should have accepted such an article for publication—although it was probably no more fallacious than the article on the effects of a high p.w.r. in August 1961 "Amateur Radio."

My issue of "Amateur Radio" arrived only yesterday and this letter needs to be posted tomorrow to reach you in time for publication in the next issue. Obviously, then, I cannot produce a complete technical article in time. However, I consider it important to state, before anyone has time to try the circuit published that—

(a) It is incorrect to say that "The addition of the extra load proposed in B during the negative voltage excursion, if of proper value, results in nearly perfect symmetry loading of the Glass B transformer secondary during the negative a

(b) The article infers that the modulator looks into a load widely varying over the audio cycle. Such is not the case in any reasonable transmitter. It also infers that distortion and spatter result from this. This is incorrect.

### GENTLEMEN'S AGREEMENT

Editor "A.R.," Dear Sir,  
The recent barrage of replies to my earlier letter pointing out the dictatorial attitude of P.E. in fostering this so called Gentlemen's Agreement warrants space for reply which you, Mr. Editor, being a true democrat will (I hope) let me have instead of curbing a controversial discussion with the blunt "correspondence is closed".

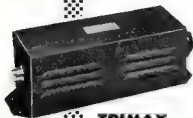
Some of the letters such as the satirical note from Jeff Vale, VKSNQ, who wants a status of Samuel Morse erected outside my home, are ignored for the simple reason he endeavours to ridicule sincerity which is never fostered in a British society.

Frank Hine's outburst has my complete support for I think it wrong that a healthy correspondence is curbed without any justifiable reason. I have spent many years in journalism and worked with editors in many countries and rarely has any subject being discussed in the correspondence columns been stopped by an editor, and the contrary is encouraged. I hope this time the correspondence will be allowed to flow in the hope that right will prevail.

Now to get back to your correspondents to date. Les Brennan, VKOJ, claims the Gentlemen's Agreement is recognised throughout the world. This is quite wrong. In America it is by regulation. The plea by the A.B.E.L. recently to get W stations off the top 15 Kc. of 14 Mc. has been a complete flop. In Europe



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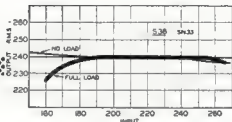


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" 66 MA	£11/3/6
" 66 MD	£9/3/0
" 67 MA ... ..	£11/3/6
" 67 MD ... ..	£9/3/0

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# FEDERAL AND DIVISIONAL MONTHLY NEWS REPORTS

(SEND CORRESPONDENCE DIRECT TO DIVISIONAL REPORTER NAMED AT PARA. END)

## FEDERAL

### NEW CALL SIGNS (OCTOBER)

VK— Australian Capital Territory  
1RS—R. D. Stephenson, 3 Carnegie Cres., Narrabundah.

New South Wales  
217P—F. H. Long, R.A.P.F., Richmond.  
2ABD—T. A. Dineen, 62 Glenishie Park, Cronulla.  
2ZEH—D. G. Hocking, No. 88 (T) Wing, Richmond.  
2ZLC—L. M. Carlton, 33 Edgar St., Auburn.  
2ZRH—R. A. Ford, 105 Stapleton St., Wentworthville.  
2ZRM—R. B. Mayall, 41 Crown St., Fairfield.  
2ZSM—M. C. Smith, 5 Perth Ave., Lindfield.  
2ZWQ—G. O. Wilson, 38 Virtue St., Concord Park.

Victoria  
3RA—B. W. Foulter, Lot 31 Arley St., Montmancy.

3WX—W. J. Kell, Staywood Park, Warramoon.  
3ACI—R. K. Bobb, 35 Adeney St., Kew.  
3AUI—L. R. Upton, 24 Delacy St., Maldstone.  
3ASY—O. W. Guy, 22 Williams Rd., Shepparton.  
3AWY—L. T. White, Downey St., Alexandria.  
3AYE—O. M. Nicholas, 14 Somerset Rd., Glen Iris.  
3ZIO—B. L. Hearn, 5 McEln St., Altona.  
3ZLL—K. R. Hales, 18 White St., Glen Iris.  
3ZMS—J. R. Dorrington, 10 Albert Rd., South Melbourne.  
3ZMQ—G. V. Conner, 11 Fesse St., Highgate.  
3ZND—N. G. Daniel, 18 Williams Rd., Laverton.

Queensland  
4EZ—R. D. Siver, 35 Jack St., Kedron.  
4JM—J. McGrath, Elliott St., Elliott Heads.  
4OS—Oskleigh Boy Scouts Radio Club, Station: High St., Dorrington; Postal: 15 Noeline St., Dorrington.

4RO—R. V. Ramon, Station: Canberra St., Ayr.  
4TOD—J. O. Punt, 200 A. St., Ayr.  
4ZDH—D. B. Hamm, 51 Ironside St., St. Lucia.  
4ZEF—Evelyn F. Barr, Station: 177 Bowen Rd., Townsville; Postal: 187 Bowen Rd., Townsville.

4ZKB—K. L. Ross, 5 Thirteenth Ave., Kedron.  
4ZRR—R. R. Robinson, 22 Hughes St., Hermit Park, Townsville.  
4ZWL—W. H. Lake, Station: Prior St., Macchance Beach, via Cairns; Postal: P.O. Box 1152, Cairns.

4ZWN—W. H. Lake, Station: Prior St., Macchance Beach, via Cairns; Postal: P.O. Box 1152, Cairns.

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The P.Z.K. (Polish Section of I.A.R.U.) is holding a Contest to celebrate the thousandth anniversary of the Polish State. Contest dates are: C.W. 2000, April 7 to 2000, April 20, 2000, April 14 to 2000, April 15. Bands 1.5 to 28 Mc. Rules, etc., from this Bureau.  
The A.R.L.I. is also sponsoring an Award called "Millennium St. Award." SP contacts made between Jan. 1, 1962, and Dec. 31, 1966, are eligible. Non European Amateurs need 20 contacts with SP stations located in at least five SP call areas. A list of QSLs held covering above contacts and certified by Australian Awards Manager, together with five I.R.C. should be sent to Awards Manager P.Z.K., Box 230, Warsaw 10, Poland.  
—Ray Jones, VKBRJ, Manager.

## FEDERAL AWARDS

During February 1963 V.H.F. Awards were made as follows:

V.M.P.C.C.  
No. 14—R. K. Cleworth, VKBSQ (ex-VKSEZ), 30 Mc. 105.  
No. 15—David Rankin, VKBQV (ex-VKSEZ), 30 Mc. 105.  
No. 16—Max Laid, VKBHD, 30 Mc. 104.  
No. 9—Bill Rushby, VKABH, 30 Mc. total 106.  
W.A.S. 30 Mc.  
No. 30—Quentin Porter, VKBHM, plus JA. VES, 2L and Papua.  
No. 31—John Barker, VKBZZZ/T (ex-VKSEZ), plus JA. VES, 2L and Papua.  
No. 32—Roy Taylor, VKBAU (ex-VKSEZ), plus JA. VES, 2L and Papua.  
—Alf Kiskie, VKBKB, Manager.

## NEW SOUTH WALES

### GENERAL MEETING

The Feb. meeting of the N.S.W. Division was held at Science House, Gloucester St., Sydney, on Friday, 23rd Feb., with an attendance of about 40 members. The President, Bill ZYS, opened the meeting at 8.30 p.m. and welcomed the visitors, John ADD and Ted Mulholland. Apologies were received from ZNNM, ZST and Alan Chalmers. New members admitted to the Division totalled seven full members and 14 associate members.

Reference was made in correspondence to the Section Boys' High School Radio Club which is progressing with an initial membership of 15 boys.

The lecturer for the evening was Barry ZKAG, President of the V.H.F. Group of the N.S.W. Division, who spoke on the "Future of Amateur Radio". Tracing the history of Radio from the time of Hertz and Marconi, whose initial experiments were conducted on the very high frequencies, Barry pointed out the many phases in which technology has increased since the years, and its appeal to the more youthful enthusiasts. The vote of thanks to the lecturer was moved by Bob ZAWA.

The time remaining was taken up with the discussion of agenda items which will be discussed at the Federal Convention to be held at Perth at Easter. The meeting closed at 10.50 p.m.

### HUNTER BEACHE

Following close upon the Dural Convention, the Gosford Field Day attracted quite a number of new members. The double postponement apparently resulted in a greater interest and all to whom I spoke were loud in their praise of the Gosford boys in selecting such a perfect spot for the annual get-together. It seems that this may become the regular venue and if so, should result in an even greater roll up than this year's record. Two of the local 144 men were successful in the second fox hunt, those clever types being Bob ZEX who came in first and President Stuart ZAYV who was 2nd. Surely the greatest news for the month, other than the Field Day, is the opening of the new television station on the hills beyond Roseville. Shannon, our mutual friend, has at last found a use for his thirty bob (v. net and now finds that two well coated pieces of string secured to the antenna terminals with 300 yd ribbon, suffices to give him a strong signal with which not even his well loved Gaisner will interfere. Now that a good signal

can be obtained in most of the zone, the problems of many members will be partially solved, especially those in very difficult areas. At least two Hectors are particularly jubilant about all this. In G land the authorities were persuaded to allow the R.G.B. to use the L.M. mast in Kent for 20 h. beams on the 3 m. band. I wonder what reception NBN would give the Institute? Apparently the service area of the new tx is quite extensive.

National Field Day activity in the zone was slight, that is on 40 and 80 mc and at one stage all that could be heard was the ring of an axe in the hills behind Teralba as a most scientific wire was changed from one tree to another. Yes, it rained about 100 points during the process.

Jim ZAMT from Coromela has now a beam for 40 mc directed to the land of Kilmawats and is having a great deal of success with it. During the A.R.L.I. DK Contest he was, as reported, top scorer for VK.

Returning to the Field Day, Ron ZASJ was on 40 for a time and in good voice, too, as well as Charlie. It was a delight to hear these chaps coming through so well. It is to be hoped the t.v. problem is partly solved for you both. Of course the regular circuit was there including Bob and Bill. I suppose you heard that shocking display last Sunday when the failure to switch on the final was blamed on a burnt out fuse? Another most unlikely story.

Chris ZPZ treated the branch to an excellent lecture, the gear of the stage, and a most interesting, illustrating his discourse with a great deal of fine equipment and some well chosen colored slides. In addition, Peter ZAYV showed slides of the I.R.C. visit to the Parkes Radio Telescope, concluding one of the most informative meetings for some time. A total of nineteen members, nine associates and five visitors were present including five of the Superior Radio staff to carry the gear! Come again soon.

By the time this appears the new officers for 1963 will have been chosen and if you missed

## W.I.A. D.X.C.C.

Listed below are the highest twelve members in each section. New members and those whose totals have been amended will also be shown.

### PHONE

Call	Cor. Cnt.	Cor. Cnt.	Call	Cor. Cnt.	Cor. Cnt.
Call	No. rises	No. rises	Call	No. rises	No. rises
VKCBH	43 258	VKCBH	43 258	VKCBH	43 258
VKCBH	43 258	VKCBH	43 258	VKCBH	43 258
VKCBH	43 258	VKCBH	43 258	VKCBH	43 258
VKCBH	43 258	VKCBH	43 258	VKCBH	43 258
VKCBH	43 258	VKCBH	43 258	VKCBH	43 258
VKCBH	43 258	VKCBH	43 258	VKCBH	43 258
VKCBH	43 258	VKCBH	43 258	VKCBH	43 258
VKCBH	43 258	VKCBH	43 258	VKCBH	43 258
VKCBH	43 258	VKCBH	43 258	VKCBH	43 258

New Member:  
VEKQZ - 87 110

### C.W.

Call	Cor. Cnt.	Cor. Cnt.	Call	Cor. Cnt.	Cor. Cnt.
Call	No. rises	No. rises	Call	No. rises	No. rises
VKCBH	10 300	VKCBH	8 310	VKCBH	8 310
VKCBH	20 260	VKCBH	18 218	VKCBH	18 218
VKCBH	20 260	VKCBH	46 218	VKCBH	46 218
VKCBH	18 218	VKCBH	39 218	VKCBH	39 218
VKCBH	18 218	VKCBH	39 218	VKCBH	39 218
VKCBH	18 218	VKCBH	39 218	VKCBH	39 218
VKCBH	18 218	VKCBH	39 218	VKCBH	39 218
VKCBH	18 218	VKCBH	39 218	VKCBH	39 218
VKCBH	18 218	VKCBH	39 218	VKCBH	39 218
VKCBH	18 218	VKCBH	39 218	VKCBH	39 218

Amendments:  
VKCBH 23 205 VKCBH 89 174  
VKCBH 43 175 VKCBH 70 128

### OPEN

Call	Cor. Cnt.	Cor. Cnt.	Call	Cor. Cnt.	Cor. Cnt.
Call	No. rises	No. rises	Call	No. rises	No. rises
VKCBH	6 299	VKCBH	3 241	VKCBH	3 241
VKCBH	6 299	VKCBH	3 241	VKCBH	3 241
VKCBH	32 274	VKCBH	7 233	VKCBH	7 233
VKCBH	77 260	VKCBH	4 231	VKCBH	4 231
VKCBH	33 245	VKCBH	43 225	VKCBH	43 225
VKCBH	40 171	VKCBH	63 158	VKCBH	63 158

Amendments:  
VKCBH 40 171 VKCBH 63 158

## FEDERAL QSL BUREAU

A change in the A.R.L.I. QSL Bureau set-up is: VEZMY, Russ Allen, VEZBC, Aeradio Station, S.N.A.C. Yukon Territory, Canada.  
WPEAK, Leroy Watts, 28 Hannum St., Balaclava, N.Y.K. U.S.A. who handles cards for all W. K. VE a.w.s. He has performed this service since 1957.

The Hunter Amateur Radio Society has been changed to the Durra Amateur Radio Transmitting Society. The President is XZST and the Secretary is XZSY with address as Box 200, Balaclava, Durra.

Cards handled by the Federal Bureau for the W.I.A., year ending Feb. '63, totalled 44,538—the highest since 1959.

Amateur Radio, April, 1962

The next meeting will be the Annual General Meeting and will be held in the Radio Theatre, R.M.I.T., on Wednesday, 4th April. See you there? 73, 1AEL.

Sorry chaps that some notes seem to have gone astray somewhere along the line recently. Rather unfortunate that we have already lost one of our members, and will be losing another shortly. Keith 3QG has left Murtos and is now residing in Rosanna. We wish Keith all the very best of luck in his new location. He is still working as a radio technician at one of the b.c. stations in the city.

News has been a little on the scarce side over the holiday period, however guess there will be more activity during the winter months when conditions are better for Hamming. 2AKW

Once again the National Field Day has come and gone, and although our activities were curtailed to some extent by the lateness of notification of Rule 8A, we did very well indeed and results will be published in due course.

In all, we had a very enjoyable week-end and as usual are looking forward already to the Field Day next year—be it the National Field Day or a memorial to the late VFAJW.

Other than the above our activities are getting into gear again for 1953. The first 50 mix tx hunt was run in March, and social events are again current. Visits to Lyndhurst Transmitting Centre and to Emmonsway Air Control were well patronised, and the 50 mix net is proving more popular every week. T.S. I.L.C.

At last, that once-a-year week-end is almost here again. We hope there's a circle on your calendar around the week-end of April 13, 14 and 15 for the Queensland Convention at Alexandra Headland between Maroochydore and Mooloolaba on the near North Coast. The site at Alexandra Park is just 80 miles from

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Organizer Vince 4WJ has included these attractions, competitions with prizes, club participation events, a barbecue on Saturday night, continuous operation of 4WJ, the holding of the Wide Bay and Burnett hook-up from the site, displays of the most modern Rann equipment available, and an auction of secondhand gear. The week-end promises to be the most successful Convention yet, so don't be in the ranks of those who are sorry later they didn't attend, and let's see your happy smiling face at the Alexandra Headland Convention.

Latest news on the Jamboree of the Air in Queensland is that Hqrs. Commissioner A. A. "Skip" Jackson has been appointed organizer on the Scout side of things. "Skip" has had an interest in Amateur Radio for many years, being a foundation member of the W.I.A. in Queensland and helping to build the first 4W1's. Rival interest is being shown by Rockhampton Mayor (Alderman Rex Filbeam, M.L.A.) and Redcliffe Mayor (Alderman Jim Houghton, M.L.A.) and press i.v. publicity certain.

Good deed might be done by the v.l.f. boys over the Easter week-end. Arrangements are going on for their taking part in the communications set-up for the big South-East Queensland Senior Scout venture in the Too-womba-Lockyer area. If the gear doesn't spark on the Convention, then there'll be four days to find the fault.

More sessions being offered by Alas 453 are being much appreciated by Amateurs in the British area. Transmission is now on 3560 kc. between 6700 and 9730 and 1200 and 1930 on Sundays, and 1800 and 1930 on Wednesday nights. The Morse is offered in two sections, the first Ave to eight w.p.m. with some words repeated, and the second 10 to 18 w.p.m. The second section will be speeded up as the exam. draws near.

Several members and associates on the mend again after being on the sick list. Stan 48A after a couple of weeks' holiday had a little leg trouble and had to be taken to Greensboro Repet Hospital by ambulance but is now back on duty. The carpal tunnel sufferer Steve 48B, came to the big smoke from Bundeberg for an op. late in Feb. but should be home well by now. The frilly apron of Howard 4W0 has been worked overtime since his XYL was admitted to hospital for an operation. Enthusiast Neil 4Ran is showing increased interest in the game again after recovering from bad knee injuries received in a road accident.

Like to keep the smile on the face of the inward QSL man, Jack 4JY, because of the success in keeping the cards moving? The following can do their bit this time: 4XR, 4NR, 4OH, 4KP, 4RR, 4MD, 4WG, 4ZBZ, 4ZHG, 4ZBP, 4ZNS, 4ZBS, 4ZBT, 4ZEL, 4ZMG, 4ZAX, 4ZAA, 4ZDJ, 4ZAP/P, 4ZAW, 4ZCP, 4ZRH, and 4ZDA.

Watch (we hope) for a sudden swelling in the Amateur ranks in the Sunshine State during the year. What with such large classes as 20 at the Northern Command Signals Amateur Radio Club's A.O.C.P. course in Brisbane, and another 20 at Bundaberg, the bands will be rocking with new call signs. The Bundaberg class is first as the intense interest there has already brought almost a score of new associates to the W.I.A.

The interest almost puts to shame the efforts of members on Sunday mornings around 0915 on 7105 kc. during the 4WI hook-up after the news. Give the station men Stan 45A and Alf 40L some reward for their time and effort in arranging the news and the hook-up by calling in, even if only to say you are listening. Surely from all of Brisbane in particular more than

Soups of Calumet can't be unadorned.  
 Life in the South offers our  
 The Pandey silent in VKS land who must by the  
 be struck down with the mysterious illness  
 of frustration at not being able to pay his  
 licence fee without untangling miles of red  
 tape to find the Receiver of Public Moneys.  
 I could say the only remedy is to shift camp to  
 the Sunshine State with its numerous Post  
 Offices for Amateurs, but, same, I look out  
 to find the rain pellets down. Must be  
 Down

The Feb. monthly meeting at the Central School, Gympie was presided over by Eric KKR, with members from Maryborough, Namahour and Gympie. The absence of the Bundaberg boys was regretted but the distance is a bit far. Main items at the meeting was a ballot for the disposal gear and one member went home with the midgets of his car resting on the wheels (didn't you, Ken!). After a

discussion on projects for the year, John Lind gave a talk illustrated with slides on transmission lines from power house to public which was most appreciated by all.

After the lunch break, the speaker was now going through the clames at Gympie, and will soon be adding QRKM to our bands (not a.n.I hope).

A comparative stranger to our ranks was Col 4TW with his XYL and their six pigeon-penning. His CPU looks like being up with the top scorers in the Rees Hall Contest, while Mac 4HD is now holder of W.A.R. on 50 Mc. after a 12-year wait for that. VKS Congrats. to the 100th birthday of the late and much missed 144 Mc. Harry 4ZHG has had a whale of a time on 50 Mc. and is now playing with 144 Mc gear. T3, 4ZHG.

The local press says that old timer J. Thompson 4XP will soon be back on the air from up Natural Arch way as power mains are being extended to his locality. Welcome back, JIM.

Not much pleasure from the National Field Day because of extremely poor conditions. Few contacts on Saturday were followed by a stormy Sunday.

With the assistance of Bob, president, members of the Southport Radio Club, and Scoutmaster H. Blake and a number of Scouts, the vertical antenna for Del 4R3 was erected. By now, an excellent tx and rx built by Frank 4FN, a very old and esteemed friend of Del, should be installed. Del and his XYL extend their thanks and appreciation to the very willing workers. T3, 4W8.

At the last meeting of the Townsville Amateur Radio Club the main item of the night was the ballot to see if the members wanted to affiliate with the W.I.A. The result was a unanimous vote to affiliate with the W.I.A. As the newly formed club in Ayr is affiliated with the Institute also, it points out the fact that all Amateurs should belong to the W.I.A. and strengthen their cause when kindred powers want to take great strips of our frequencies from us.

Frank Sturges gave a very interesting lecture on the equipment used at 4TO, and to finish off an interesting evening, Jim Daly gave a lecture dealing with structural strains and stresses, etc., that occur when aerial towers are constructed.

John 4DD has departed for Sydney on a spot of leave and has taken his new a.s.b. rx with him. Bob 4MF has at long last decided why the best seat is and is anxiously awaiting delivery of a Hallcrafters rx. Bert 4LB has also invested in a certain well known make of a.s.b. tx. Does it run on batteries, Bert, or do you just keep it in a dry cell? Looks like Alan 4PS is getting prepared for lots of DX or possibly to help get the R.D. trophy for VK4 this year, as he has thoroughly overhauled his beam and tropic-proofed his motor.

One of our P.M.G. boys at Ingham has entered the ranks of Ham Radio and has a Z call. His name? Bill Pickering.

The Burdekin Radio Club had its monthly meeting a few nights ago and after much discussion a constitution was adopted and I noticed certain sums of money being eagerly grabbed by our Secretary John McKenna from members who want to join the W.I.A.

Joe JOJ still determined to get his 1988 going on a.c. Norm AD still prolonging the agony of the local Ham, of whom five live in Ham's slough. Three of them, he says, are going where there will be no more what they will use. Had an official visit from Graham BXB in his capacity as RL, and am pleased to state that all great expectations exceeded the fact. A Ham, Hano, Graham.

Flash! Just got a ring on the phone from our regular scribe 4RW. He has arrived back home from his overseas trip and was full of news. He has a new car, and a new house. He brought back with him. Also has bundles of xials up to 12 megs. Another Ham has moved into Ayr in the person of Don Red. He hasn't flat at the moment. When you get around to finding a house Don, there isn't any in Ayr, but I believe that houses are very easy to get.

Well apart from doing my shift at the Best Breeding Station in Queensland (too modest to say it is the best in Australia, even though it is), working some DX, keeping young (three of 'em), and keeping in the best of health, it is in the lounge I have anything to report on my own dolings. But if you hear any vicious rumours that my wife Jess keeps the gram down, with no assistance from me, I can assure you that it is a terminal illegitimate sneeze. . . . The . . . the . . . because . . . the petrol and oil and when she is really weary, I fill the mower 73, Canada 61X.

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## SOUTH AUSTRALIA

The usual general meeting plus the monthly general meeting of the WKA Division was held as usual in the clubrooms to a representative gathering of members and visitors, a little below normal in number, although I feel the answer to that is because the foxes once woke up to the fact that two general meetings were being held together on one night, and the prospect was one that did not need to be heartening to see the number of young members present, although there again that might have been because they were not a wake up, and were caught before it dawned on them that they had been invited. However, as usual, as may, the roll-up was quite pleasing, and this I can guarantee, a good time was had by all.

The annual general meeting opened quietly, carried on quietly, and closed in the same manner, so much so, that the chairman, John SJC was forced to adjourn it for a while whilst the votes were being scrutinised by the two appointed scrutineers, Leith SLO and Mick SZDA. Incidentally, there is no truth in the rumour that Leith used a pair of binoculars to do his scrutineering, that's just the way he holds his hands when he is concentrating.

Whilst the annual general meeting was in a state of coma, awaiting the results of the ballot of the Council, the monthly general meeting was opened up and pressed for a quick decision on its way to coming to a stop on Federal business as two inscrutable scrutineers came from behind the curtain with the results of the Council voting. No surprises occurred in the voting, all of the sitting members being returned, with the addition of a couple of new ones.

Smoko was then called to the QSL cards handed out by the BRX, and the general meeting got under way. It did not proceed very far before Luke SILL came back from a little trip he had apparently made on his magic carpet and asked the chairman were we in the annual general meeting or the general meeting? In the ensuing confusion, gay reports and general hilarity, the chairman was hard put to decide whether he was in the annual general meeting, the general meeting, or the general ward of the 'nut house'. However, with characteristic wit and vitality, the chairman firmly brought the meeting back to sanity and business, proceeded

At this point Council sprang what was only to be described as a bombshell and a stab in the back. The chairman told the members that Council had been examining the Honorary Life Membership and felt that the time was ripe to enlarge the list and with this in view it asked the membership to endorse the bombshell. BAK and Warwick SPS are the two Life Members and the recognition of their services over a long, long period of association with the Division. The bombshell was enthusiastically endorsed by George, and to the tune of some coins and some remarks reluctantly endorsed me. To George it came as a bombshell and a complete surprise. He said that he had never been thanked all present for the honour bestowed upon him, and made it quite plain that anything that he might have done at any time was done for the good of the Division and that it was always been a pleasure to do so.

To me it came as somewhat of a surprise, although I am always prepared for any move that Council might make to muzzle me. I assure you, how can I fight and battle with Council if the said Council bestow on me such an honour, and so soon after their recent letter of thanks for my assistance at the Xmas Get-together. I am stripped of my weapons, my spirit is humbled, and nothing but remains than for me to drain my fountain pen of ink and sit in the front row of all Divisional meetings and say yes, yes, and again yes. Joking

aside; I was deeply honoured, and can only say, like George, that anything that I have accomplished, has only been attempted in an endeavour to put back into Amateur Radio a little of what I have received from it during my long and happy association with the finest and best Division in VK!

There will now be a slight pause whilst we all fall on each other's shoulders and have a good weep.

Agenda items were then read and discussed. By Phil the photographer, SNN, may be getting a pinhole in his hollows, cause him, Brian SJR and the meeting in connection with the Glandore Boys' Home Radio Club. Luke asked some sticky questions regarding the picnic. Keith SJR 1511 asked questions on the agenda items, on the building fund, and with the time rapidly approaching zero hour, the chairman applied the gag and the meeting, or meetings, were over. The meeting was a success and had been had by all present, and as the time was now 11.05 p.m., a few hardy souls stayed behind to clean up the room, informing the little bit of the meeting. The meeting every-day problems associated with our hobby.

A welcome visitor to the meeting was Freddy SFL, almost a stranger these days, more's the pity. Listed in the members renewing their subs. was Bob SLP. Have not heard this one on the air since we both lived on the Esplanade at Henley Beach. His QTH these days is "Pine Lodge", Mount Lofty (ADST to you), and apparently he has come under the influence of some of the bods up there.

A lot of work goes on behind the scenes of Amateur Radio and a deal of it does not see the light of day. Witness the little tale of the "Glandore Boys Home" mentioned in the Clubs established at the Glandore Boys Home and the Magill Boys Home. Without any fanfare, the boys of the Glandore Home have taken a part (probably a lot bigger part than he let us know) in the formation and operation of the Glandore Amateur Radio Club. It is a desire to help these boys along a somewhat difficult path. Unfortunately, due to circumstances beyond our control, he was found that he could no longer give his time to the boys and he wondered if any member or club would be prepared to help. Think of it, a boy who has been through a lot about it follows a path that is not the way or you would like some details, then send him and he will be only too pleased to oblige.

Doc SMD did not nominate for Council this year, and except for 1950-60, this will be the first year that he has been out of office of some sort or other since the Division commenced after the last war. He has in his time held every executive post on Council, and for many years he and the Division have been synonymous. He has not been in the best of health recently, but he probably decided not to give Council duties a rest although he will always be available from the sidelines.

Jim SJ8 from Leigh Creek, and Joe SJ0, the newly-weds, heard in a short contact on 7 Mc. just before the SWI session the other Sunday, but did not stop with them very long because Joe was openly boasting, with a smirk on his face that could be heard miles away, of how he had just had breakfast in bed. How do you do it, Joe?

Jim 5JB was heard later on in the morning in QSO with Keith 5WI and said that he was not on very much as he was still QRL around the house. It was the first time that he had been in the call-back but expected to be in all of them now. Welcome Jim, good idea to get in the call-back, it is the best way to get known far and near.

Talking of Leigh Creek reminds me of Port Augusta, and talking of Port Augusta reminds me of Tom SAQ, who was also heard in the call-back passing on the news that Hughie SAZ was leaving Daly Waters and had already closed down his station at the locality. There you are Tom, everybody gets a mention, a.b. or any other peculiar form of behaviour. Chortle-

John 5YA, probably better known as ex-  
posed, heard on 5 Mc. with an extra good  
signal from Port Pirie on Sunday morning.  
More will be heard of this signal. Bill 5XB  
from Kingston heard talking to 5WI and using  
the same code. Heard 5YB on 5 Mc. often,  
but when we do he always comes in on  
more than average strength. Heard him calling  
Charlie 5ON later in the morning. Wally 5DF  
heard him on 5 Mc. many times and saying  
how he had settled down after a spot  
annual leave. Now and then a gulp was heard  
in his voice as he talked, probably caused by  
his voice too tight. What I won't say is  
get a laugh!

Comps SEF, my once-a-year journalistic friend, heard on 7 Mc. mobile somewhere near Tarunda. Was using a commercial s.b. transistorised set-up in his Model A Ford, and

to prove to him for once and all that I can (when I deem it necessary) read a.s.b. he gave the name of the maker of the gear, which was "Coosawarra". How subtle can I be? I had never heard of Coosawarra, a missing operator from the hamlet of Pawlet, that will make him do a fandango in parallel, but I think that I heard him mobile on the air some time after the war. I just heard him at we went by, only were by the voice. Tom STL, who at the moment of writing appears to have mislaid his pen, was heard on the air some time after the war. I usually strong signal, although I thought his coarse remarks about a certain suave, sophisticated, athletic and big-headed, and being a denonair sub-editor at the time, somewhat in bad taste.

To me anyway!

Heard this week that Neil SZAW is awaiting his new call sign. Nice work OM. Now you can sit on my side of the room at the meetings and become one of the "Squares". If you listen intently, very intently, you might, I say, you might, hear my signal and we can have a contact on 7 Mc. I even QSL.

On and off in these notes, reference has been made to one, Dale. Well now it has happened. Dale now boasts the call of 5ZER and is all stoked up for 8 mcs. Congrats., OM. This will be his last mention in these notes as he now becomes the property of the v.h.f. scribe and therefore unouchable to me, not that I am frightened of the wrath of the said scribe, just

**Talking of being careful.** Did you notice how those VK4 scribes reacted to my slight, ahem, reference to them. I was putting on my battle dress, prepared to do to the death, when my XYL lifted me up by the arms and said, "Petals, don't play with those VK4 boys, they might play rough". Don't think they have scared me. Oh no, it is just that whenever my XYL tells me to do anything, I always

Ern SEN heard mobile on 7 Mc., en route to a tennis tournament. A good signal down here. Arthur SHY heard on 7 Mc. with a low power a.s.b. rig, and talking about a linear on the way. Dear oh dear, another good man bites the dust.

Joe, SRC was heard plaintively calling SWL on a.s.b. the other Sunday morning. He tried, and he tried, and he tried, but all in vain. My suggestion is to you Joe, get out your bagpipes and do a bit of rock and roll and Keith will be sure to start in protection. And you, Joe, I am big, Keith's wife, after all, Scotchman on a.s.b. Lance BXL was another to call a couple of times, but he was lucky he managed to get in the act after an hour's wait. His harmonic, a somewhat big harmonic, Rayson, was heard to call with his call sign (BCR) and the activity in the Clare area is to be seen to be believed.

Les Jams has been advised of his success in the last exam, and by the time this is being devoured by all my avid readers (perhaps), Les will be a new call sign on the S.E. list. It is good to welcome Les and Dale to the ranks of the Mt. Gambler boys, as the last intake goes back quite a few years.

Col SCJ has also been on holidays but has been heard at times on the now famous "lunch time sked" on 7 Mc. As a member of the rival b.c. station, I manage to pick up quite a lot of news of the opposition from those seeds, so beware, little brother is looking and listening!

Received a welcome letter from Les BUX, "Globe Xray" to you, in which he raves in praise of the station and the staff, and the absence of 1 or 8 years. He gives a list of DX worked which would even turn George Miller green with envy, including a c.w. contact with a station in the U.S. who has been on the picture, as he sees it, of Amateur Radio in Alice, and says that ROW is very active at 14 MC. He says that he has been on the air, and is on with a.m., c.w. and s.a.b. (oh, oh, oh!) in Bachelor, and in Alice Frank SAE is very active, and that he has been on the air frequently with c.w. on 14 MC. SEW is not terribly active with s.a.b. (oh, will it never stop!), but he is on with c.w. and s.a.b. on 14 MC. Tips. Apparently the poor kids at Alice are running the school by themselves. I wouldn't wonder if they were. George's headmaster has six hands on where he sits down!

Well, again we come to the close of another month's notes, and unless I am prepared to be called a coward, I cannot dodge reference to what has now become known in VKS, with characteristic clarity, as the "Photo Incident." A technical mirth, as the "PHOTO". There is not much I can say in my defence, other than that I was taken advantage of, but I feel that I must excuse all those who wrote, or hung up, or otherwise annoyed me with their harsh-words, especially the person who posted up the photo on the staff notice board with the caption, "Wanted—dead or alive—preferably with a bullet through the head." I am sure that the child's handcuffs through the post, also with

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the caption, "Try these on for size, and then report to Doc SMD". To say nothing of the wellwisher who went to the other placing a sponge cake on my front doorstep, inside of which was a letter of decision in which nothing has happened as yet. To the Magazine Committee, Yd Ed, and to the committee's secretary, who sent me a letter of decision informing me that my photo would be in the March issue of "A.R.", and, incidentally, tricked himself, because it was already in Feb. The c.w. section of the contest, to the "old chassis giver-away" who descended so low as to allow his linsynope machine to join in the competition, and, finally, to the "old chassis quick, and disillusioned, I sign, more in sorrow than in anger, 73, de SP8-Pansy to you.

P.S.—Excuse the verbosity—but they all want a mention—and who am I to discourage them!

## TASMANIA

We extend our deepest sympathy to Alan MY who under the death a few weeks ago of his Father. The old gentleman was 86 years of age, and remained active and well until his final short illness.

The club room fund raising committee was delighted with the result of the auction after the Feb. general meeting. They have realised £20/17/6, which will help to swell the fund. Len TLE has moved into his new home at 141, Middlefield, Hobart, and the club's members confidently expect to hear Len, both on the h.f. and v.h.f. bands in the near future, once he has fully settled in.

The c.w. section of the A.R.R.L. Contest in Feb. was favoured by excellent conditions as far as the 7 meg. band was concerned, and a contest per two minutes could easily be maintained. It might be appropriate at this point to draw the attention of phone-operating AMs to the gentlemen's agreement as to the division of the bands. I have noted a VK9, a VK3 and a VK1 regularly operating on about 7030 kc., and this occurred during c.w. contests as well.

While growling, we can only express disapproval of the invasion of the 80 mc band by commercial operators, which has taken place during the past few months. This band is now approaching the condition of 7 megs. We must operate within our allocations, and we can only hope for a similar approach by licensing authorities elsewhere in the world.

The 80 mc band on Monday evening, 6th March, produced much interest. To have heard and worked on that band, with Ws and 7As and other Americans coming through during several hours. It was a joy to work the band. Ted T2Z has finished his new final and he is delighted with its efficiency. Chas TCH and Ken TKA had the long week-end at the beginning of March away on the yacht Moorina, when they worked back to the metropolis on mainly 80 mc. It was also good to hear Bob TQM again.

Visitors during the past month to Hobart have been Alan VR4CB and his XYL, Beattie; Bernie Z3IO and Den TDK.

I am sorry to report that Doug T2W feels unable to produce much interest to Council for the ensuing year, due to the fact that he will be very busy installing new gear at the place of his employment. Doug has worked well, and we look forward to his re-appearance at the helm of things. 73, T2Z.

## NORTH-WEST ZONE

First, my most humble apologies fellows for missing out on previous notes. However, we are in business again, but news is scarce. A tx hunt was held during Feb. and although the attendance was small, a good time was

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had by all. TKH, YSF, YXCL and YMX made the grade, but YMS fell by the wayside some place. The idea of planting a tx alongside a railway line has little to commend it if you happen to be on the receiving end. Several XYLs were present and they, too, enjoyed the show, as did the harmonics.

Was much intrigued to hear Frank and David on the band the other night talking shop. Could they be were looking for a monkey for that reason?

T2ZW is a consistent occupier of the band now and is making many contacts. Good show. Athol, you must use 'em or lose 'em. Unfortunately, I know that you are and that the TMS appears to be in rx trouble lately, but these things are sent to try it lately. David, had my share of blow-ups here lately as well. Was privileged to visit the QTH of T2W, at Postana, recently and saw a very neat set-up. Nice work, John.

T2TT making more sporadic appearances lately. What is going on? Have not heard Wynyard or Stanley lately, so wonder what is cooking that away. Heard whisper that Harold was in VK3. Once again the Gawkbbox has reared its ugly head in our midst. Despite explanations, I know that it is and that the QTH of T2CL has nothing to do with 50 Mc.

Have just returned from the March meeting of the zone, and we were all delighted to meet George Smith, who is stationed at 12404 for a time. Welcome to the zone, George. Bob Z2AA gave an interesting lecture on v.h.f. self-demonstrations to match, rounding off the show with some very nice colour slides he has taken in scenic spots. Thanks Bob. Following that, T2CL produced a mystery box which proved to be a v.h.f. rig. Anybody can Class A amp, with a gain of about 5 megavolts to finish it off. Would be well received. 73, T2MX.

## HAMADS

Minimum 5/-, for thirty words.

Extra words, 2d. each.

Advertisements under this heading will only be accepted from Institute Members who desire to dispose of surplus equipment which is their own personal property. Copy must be received at F.O. Box 36, East Melbourne, C3, Vic. by 8th of the month, and returned to the advertiser by 15th of the month. Call advertisements are now permitted in Hamads. Dealers' advertisements not accepted in this column.

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**FOR SALE:** LM10 Freq. Meter, £28. Grundig G40, £24. A.W.A. battery operated Mod. Osc. £10. Heathkit OM1 3" Oscilloscope £37. Few left, commercially-made Beams, 4 el. 5 mx and 6 el. 2 mx, 300 ohms, can be folded up like t.v. antenna, £6 each. Eddystone 750 Rx, very good cond., £100. H.R.O. mx Rx, £33. C.R.O. Indicator Unit, Type A1047, £17/15/0. 12 volt Transistor Power Supply, 50w., 400v. output, home brew, £16. 3 Transistor xtal locked Converter, 40 mx, feed into b.c. or car radio, £11. All band pre-amp., £5. Kingsley 59er, £25. 100 watt Power Address Amp., containing 950v. 250 mA. Power Trans. two 300 mA. Chokes, two Fil. Trans., one for 866s, output trans., wired, no valves, £20. 6 volt. Vib. Pwr. Supply, low power, £15/5/0. 22 or 122 Set 12 volt Vib. Trans. 100 mA, 200 mA Chokes, 600/600 ohm Line Trans., 600/6000 ohm Line Trans., all 5/- each. 3BZ Tx, no valves, £4. Type S Pwr. Supply, £10. Ribbon Mic., 50 ohm, £17/10/0. Linear Amp. with high power pi-coupler, using 4 only 6AG7 in g. grid, driven by 6AG7, £11. Geloze v.f.o. in cabinet, £11. Assortment of Power Trans. and Supplies, 750 aside, 300 mA, £4/10/0. C.R.O. Trans., 2.3 uV, 15/- Large (and heavy) metal cabinet, containing several dozen EF50s, all wired on small chassis with resistors and condensers, £11/10/0. Other bits and pieces—the thoughtless accumulation of gear over several years—big clean out. T. E. Straghaire, 185 Stephen St., Yarraville, W.13, Victoria.

**GELSO** Rx Front End, never used. Complete as purchased, £25 or reasonable offer. And Kingsley AR7 in rack, pwr. trans., 100v. xtal box covering 14 to 21 Mc. Needs attention, no xtal remainder, "go" £10 or offer. VK3ADL, Phone WF 8653 (Vic.).

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